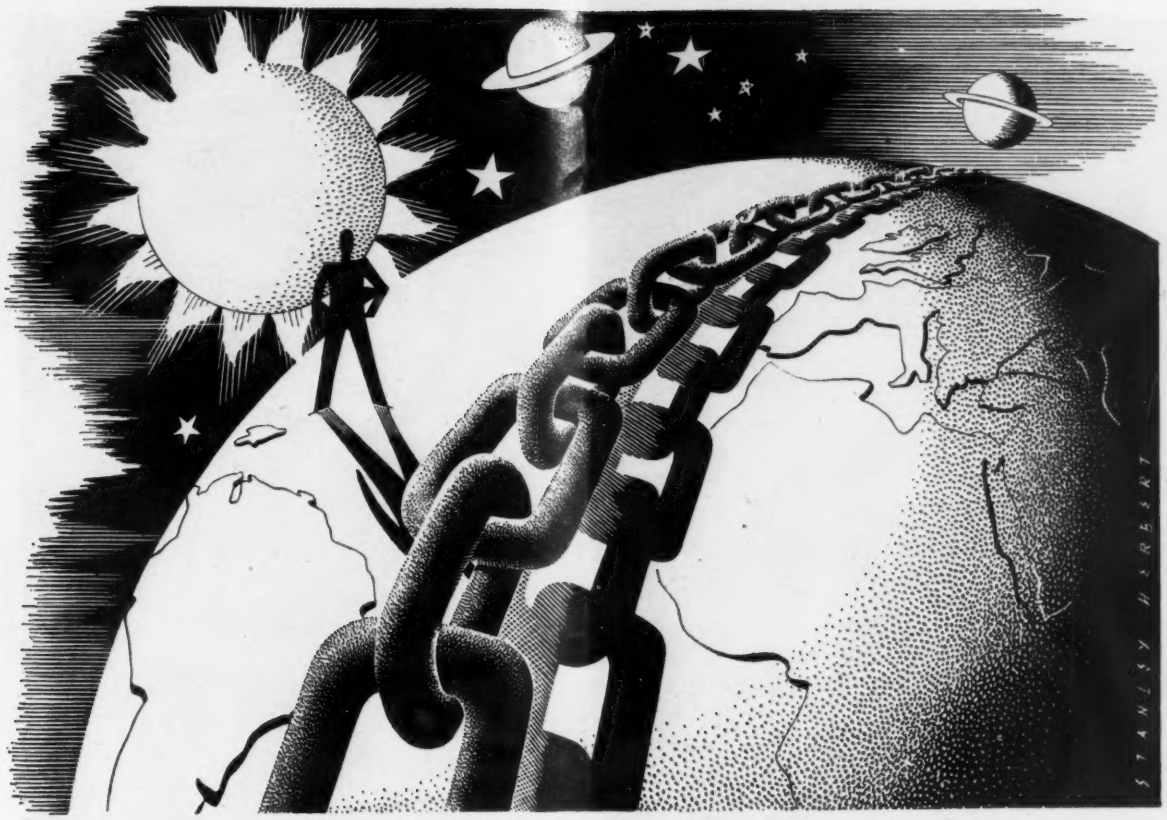
The Mining Journal

Established 1835 — Railway & Commercial Gazette

Vol. CCXLII No. 6190 — LONDON, APRIL 9, 1954 — PRICE 8d



LINKS IN A WORLD-WIDE SERVICE

HOME SUBSIDIARY COMPANIES.

GEORGE COOPER & SONS.
Nuts, Bolts, Washers and Fastenings.
DARLINGTON RAILWAY PLANT & FOUNDRY CO. LTD.
Switches and Crossings, Railway Accessories.
DICK'S ASBESTOS and INSULATING CO. LTD.
Asbestos Packings, Jointings and Insulation.
KETTON PORTLAND CEMENT CO. LTD.
Portland Cement and Ketton Freestone.
LOWMOOR BEST YORKSHIRE IRON LTD.
Wrought Iron Bars and Sections, Plates and Sheets.
MIDLAND IRON CO. LTD.
Wrought Iron and Steel Bars and Sections, Hoops and Strips.
NORTH LONSDALE TAR MACADAM LTD.
Road Construction Engineers and Contractors.
SHAP GRANITE CO. LTD.
Architectural and Engineering Granite. Precast Concrete Products.
SILENT MACHINE & ENGINEERING CO.
Food Preparing Machinery.
JOHN SMITH (KEIGHLEY) LTD.
Overhead and Derrick Cranes. Stone Working Machinery.
THOMAS SMITH & SONS (RODLEY) LTD.
Steam, Electric and Diesel Cranes. Universal Excavators.
WIDNES FOUNDRY & ENGINEERING CO. LTD.
Castings and Constructional Steelwork for the Chemical, Oil, Food and allied industries.
JOHN WILLIAMS (WISHAW) LTD.
Steel Plates and Sheets. Wire and Wire Products.
WOODHOUSE & MITCHELL.
Machine Tools.

OVERSEAS SUBSIDIARY COMPANIES.

THOS. W. WARD (BELGIUM) S.A.
8, Longue Rue des Claires, Antwerp.
THOS. W. WARD (INDIA) LTD.
Marshalls Buildings, Ballard Road, Bombay and 22, Brabourne Road, Calcutta.
THOS. W. WARD (SCANDINAVIA) A/B.
Birger Jarlsgaten, 131A, Stockholm.
S.E.D.I.M.
44, Ave de la Grande Armee, PARIS XVIIE.
THOS. W. WARD (AUSTRALIA) PTY LTD.
243, Castlereagh Street, Sydney, N.S.W.

The business founded by Thos. W. Ward in 1878 has grown from the smallest of small beginnings into a major commercial organisation with links throughout the entire industrial world.

Closely integrated with engineering and the heavier industries, the Ward Group of Companies produces many raw materials, manufactures a wide range of plant and machinery and provides at home, within the Commonwealth and throughout the world an infinite variety of general engineering products and services.

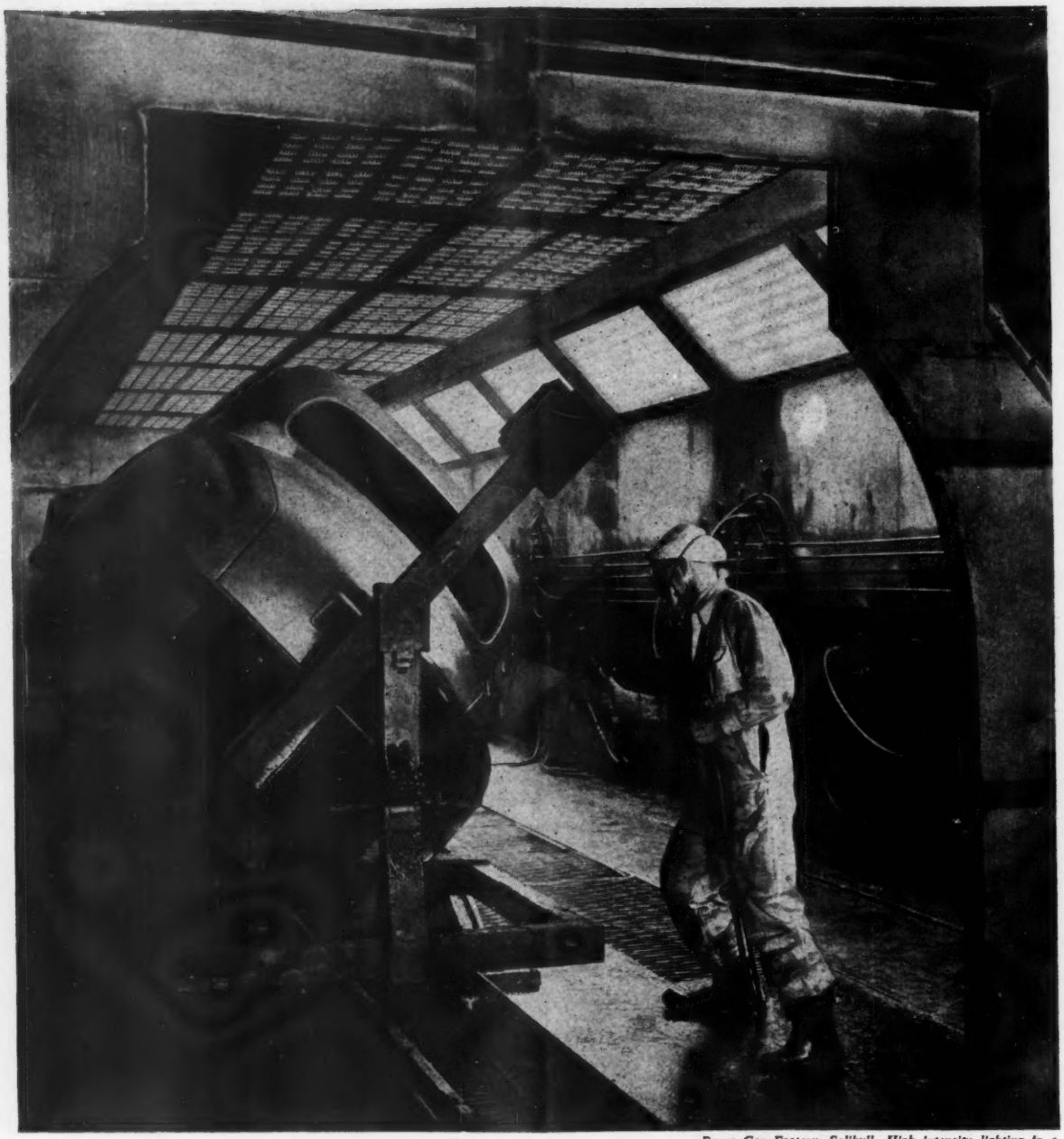
Link by link the chain has grown—purposefully, for service to industry—strengthened and annealed by 75 years' progressive experience.

THOS. W. WARD LTD

ALBION WORKS · SHEFFIELD

and

LONDON, GLASGOW, MANCHESTER, BIRMINGHAM, LIVERPOOL, BRISTOL, GRAYS, WISHAW, PRESTON, BARROW, BRITON FERRY, MIDDLESBROUGH, MILFORD HAVEN and INVERKEITHING.



Rover Car Factory, Solihull. High intensity lighting in a body spray tunnel by fluorescent lamps in a glazed enclosure.

Tailored for the job

The lighting of many processes is vital to the smooth and rapid flow of work and to the quality of the finished product. For example, poor lighting could make a spray tunnel into a bottle-neck — each job taking a little too long, a little portion missed, a return to the spray line — and so the whole production line marks time. Whatever form it takes, good lighting not only helps to provide a satisfactory working environment but is an active production tool.

Fluorescent lighting is as good as daylight — only more consistent. It is efficient; it is economical; and it is *flexible*. You can 'tailor' it, easily and exactly, to the special requirements of production at all stages.

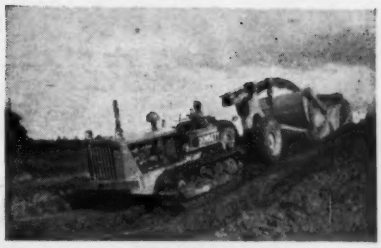
HOW TO GET MORE INFORMATION

Your Electricity Board will be glad to advise you on how to use electricity to greater advantage — to save time, money, and materials. The new Electricity and Productivity series of books includes one on lighting — "Lighting in Industry". Copies can be obtained, price 9/- post free, from E.D.A., 2 Savoy Hill, London, W.C.2, or from your Area Electricity Board.

Electricity for PRODUCTIVITY

Issued by the British Electrical Development Association

The British 'Challenger' now a world contender

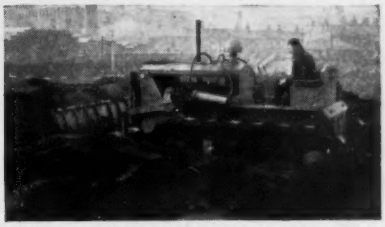


Hauling a 13-yard scraper this Challenger 4 is filling in the worked out Esswood open cast coal site at Essington in Staffordshire.

Five thousand feet up in Southern Rhodesia this Challenger 3 is bulldozing to prepare the ground for a new workshop extension.

In clay bunkers at Surajpur, India, one man is worth a whole labour battalion when he is at the controls of the powerful Challenger 3. This British Diesel Crawler Tractor is building a great reputation for versatile efficiency right round the world. In countries new to the mechanical age the Challenger's comparative ease of operation and maintenance are proving their worth.

Equipped with a 9-yard scraper, this Challenger 3 is moving pure white sand to form a canal near Veta Palama, 300 miles north of Madras.



A Challenger 3 fitted with hydraulically operated Bulldozer/Angledozer is used by this gasworks in England to stack coal.

AFTER-SALES SERVICE

Wherever a machine is sold—no matter how remote the locality—spares and service are readily available.

FOWLER LEEDS **Challenger British Diesel Crawlers**

John Fowler & Co. (Leeds) Ltd., Leeds, 10.

CABLES: "FOWLER LEEDS" TELEPHONE: LEEDS 30731

PRODUCTS OF THE MARSHALL ORGANISATION GAINSBOROUGH, ENGLAND

Concessionaires for Great Britain: Thos. W. Ward, Ltd., Albion Works, Sheffield, 4

The Mining Journal

Established 1835

Vol. CCXLII No. 6190 **LONDON, APRIL 9, 1954** **PRICE 8d**

CONTENTS

Published by The Mining Journal Ltd., at 15 Wilson Street, Moorgate, London, E.C.2. MONarch 2567 Subscription £2 per annum

NOTES AND COMMENTS

Keeping on Course

Politically, it is easy in a Budget to cut taxation, it is only slightly more difficult to increase it ; but it is extremely hard to get away with leaving things alone. Circumstances have compelled Mr. Butler to try.

On the basis of present taxation an ordinary surplus of £14,000,000 could be envisaged compared with an estimated surplus last year of £109,000,000 and a realized surplus of £94,000,000. Judged against these figures the cut in taxation of £4,000,000, which has been condemned widely as niggardly, seems almost generous. It is true that the crushing weight of public expenditure had left Mr. Butler little room to manoeuvre ; but his immobility was not wholly forced upon him ; it was willingly assumed for two reasons. First, the effects of 1953's Budget have not yet been worked out, and secondly the cost of its concessions have not yet been fully paid for.

If one may follow Mr. Butler—though without his attitude—in a fluvial simile, the undercurrents of the economy are not less fluid because he has refrained from doing more than dabble the surface with his oar. The dabbling that he has managed to do is exceedingly important, especially for manufacturing industry. The old initial allowance scheme gave industry nothing but the benefit of an interest-free loan, for the initial allowance was an immediate deduction from the total allowance which would have come in due course. The new investment allowance is a full allowance against tax—at the same percentage rate—which will not have to be paid for in future years. In effect, this will cost the Chancellor virtually nothing in the first year (since it operates at the same rate as the initial allowances) and only £4,000,000 in the second year, but its net additional cost to the Exchequer will build up over the years to a sum equalling the tax on 20 per cent (assuming the rate remains unchanged) of gross national fixed capital formation. The incentive effect is likely to be much less for the mining industry which already enjoys an initial allowance rate of 40 per cent. Mr. Butler believed that mine works would still find the new 20 per cent investment allowance more favourable in the long run than the old 40 per cent initial allowance but undertakings are to be allowed to choose for themselves. Further details, and particularly safeguards against abuse, are to be made known in the Finance Bill and until then final judgment—at least for the mining industry—had better be reserved.

Owners of private businesses will be glad to hear that they are to enjoy the same relief of 45 per cent now enjoyed by agricultural land on their holdings of buildings, plant and equipment. There is no doubt of the hardship suffered by small businesses but there is nevertheless the same sort of objection to this proposal as to that of granting tax-free increases to judges and Members of Parliament—and for the same reasons.

Other Budget proposals seem matter for argument rather than of substance. But that is not all there was to Mr. Butler's speech. Twice he referred to the drastic measures which he would not shrink from taking if circumstances demanded them and this has been commonly assumed to imply the possibility of an autumn Budget. That may well be so. But it should not be forgotten that the interest rate structure has been trimmed to make possible rapid adjustment of Bank rate if it is needed. Since interest rates are now well above those of New York the Bank rate board will be watched with even greater care on Thursdays. Two dangers are no doubt in Mr. Butler's mind. The first is the future trend of the American economy. Between July, 1953, and March, 1954, production had fallen by 10 per cent ; by January, 1954, the percentage fall had been equal to that of the entire 1948-49 recession which caused the devaluation of sterling. It is not merely the danger of a major slump in the United States which threatens, there is the more insidious danger of taking the wrong step to counteract the present moderate recession which to date—surprisingly—has had no serious effect on the United Kingdom's economy.

The second danger lies in the inability of European countries to agree on the control of improper government subvention to exporting industries. A new "standstill" agreement was made last week to cover the next three months ; but it is known that certain European countries are chafing—in the absence of agreement—to increase financial help to exporters while the German rebate system is calculated to offer up to 4 per cent of a firm's export turnover. Assistance of this kind will become more telling as the war in export markets is fought out increasingly on price and Mr. Butler will no doubt be pressed to offer similar inducements of a kind which all British Governments have so far refused.

These seem to be powerful reasons for Mr. Butler to allow his ship to keep her present prosperous course providing his eye is well peeled to discern the storms that threaten to rock it.

America—Readjustment or Slump?

With the first quarter of the year ended without U.S. trade and industry showing any recovery, discussion on what the future holds seems to be growing and the advent of the period of major wage negotiations is being watched for any indications of how managements and the labour unions will adapt themselves to the situation.

The present slackening off in business seems to have become first apparent after the middle of last year when the active Korean War terminated. Such a transition to a more peaceful outlook naturally reduced the tempo of business just as the advent of the "emergency" had stimulated it. Some reduction in business activity, especially when compared to the corresponding months of last year, is only normal, and due allowance must be made for readjustment from a cold war to a peace economy.

The well-known magazine *Fortune*, after discussing the pros and cons, concludes that this "recession" year will turn out to be the second best in the nation's history. Such a reassuring conclusion, however, is far from being universal. *The Wall Street Journal* of April 1 says "optimism relies heavily on hope. Current barometers suggest caution."

One reason for this hesitation is no doubt the increase in unemployment, which again rose though to a much less extent in the month ended the middle of March. The number of unemployed rose to 3,725,000, the highest since March, 1950, and the total is expected to exceed 4,000,000 by July, and possibly even earlier

Hearings on the revision of the Taft-Hartley Act in the House of Representatives continue with indications that the Labour committee are not disposed towards the moderation which the President so clearly desires. Meanwhile, the Longshoremen's strike in New York, which has disorganized many trades over a considerable portion of the country, came to an end last week after the intimation that the independent international Longshoreman's Association might be struck off the ballot, when the new bargaining elections take place.

On April 1 President Eisenhower signed the Excise Tax Bill, representing a cut of $7,400,000,000—the greatest tax cut in any single year in U.S. history. Hitherto the Administration has opposed excise cuts but considerations connected with politics seem to have converted the President and his advisers, and the measure is now blessed with their belief that the tax cut will stimulate the economy. Other measures of a minimum anti-recession programme are now being put forward.

Western mining industry leaders, while expressing appreciation of the recent second round of Government stockpiling, seem as determined as ever to push through their programme of bolstering their products by higher tariff awards.

While this question of whether we are witnessing a "readjustment" or "recession" or "slump" is perplexing industrial financial and public opinion in the U.S., it is also being watched with much anxiety abroad, and Mr. Butler in his Budget Speech on Tuesday attributed the cautious policy which he presented to the country largely to the uncertainty of how the American situation may develop.

India's First Uranium Plant

The uranium-thorium plant at Trombay is likely to go into production by the end of this year, according to a correspondent from Jamshedpur, India. This plant, he states, will process the residual cake left over from monazite after its rare earth and phosphate content have been extracted in the Alwaye factory.

This residue contains both thorium and uranium. Some of the thorium will be turned into nitrate for the use of the indigenous gas mantle industry, but the remainder will be retained by the Atomic Energy Commission for its own use. Thorium is now regarded as the best element for use in a breeder reactor which transforms it into Uranium 233.

The uranium remaining will be extracted and purified for use in a reactor. India hopes to possess a reactor in about two years.

The Atomic Energy Commission is also setting up a plant to process uranium to a state of atomic purity.

Australia

(From Our Own Correspondent)

Melbourne, March 30.

Drilling operations carried out by West Australian Petroleum Ltd. at Rough Range, Exmouth Gulf, have been retarded by the hardness of the rock formations encountered, but sinking has now reached a depth of approximately 7,600 ft. While no further significant discoveries have been reported, the company plans to step up its exploration activities and will spend £A2,735,000 during the current year for this purpose.

A good idea of the company's intentions is, perhaps, provided by its recent purchase of a National 130 drilling plant, similar to the one in use at Rough Range, from the Commonwealth Government for £A375,000 which will be used in the Fitzroy Basin, inland from Derby, 700 miles north of Exmouth Gulf. The company's accelerated drilling programme envisages the drilling of 11 new wells in the North-West Basin during 1954. Orders for some, or all, of the equipment have been placed and two new drilling rigs will arrive from the U.S.A. during the next few weeks. One of the drill rigs will be employed at Rough Range to drill six test wells to a depth of approximately 3,600 ft., while the second drill rig will be used to put down three exploratory holes on known structures in the area south of Exmouth Gulf, between Rough Range and Carnarvon. The deep test well, designated Rough Range No. 1, which as aforementioned has been sunk to a depth of approximately 7,600 ft., will be continued, and when it has been sunk to its final depth the plant will be removed to drill an exploratory hole in the Cape Range structure to the west of Rough Range.

URANIUM AND THE GOLD MINING COMPANIES

There has been a great deal of uranium prospecting carried out by mining companies in recent months. In addition to the work already carried out by Uranium Mines N.L. (a private venture formed specifically to prospect for uranium), and Norseman Gold Mines N.L., whose discoveries in the Lake Dundas area were referred to in *The Mining Journal*, February 26 and March 19, there has been activity reported at Mt. Isa, North Queensland, where leases have been pegged and reports refer to intense radioactivity from samples taken from certain areas. The centre of activity is 25 miles north-west of Mt. Isa mines and the Mt. Isa Mines Ltd. has advised that it has pegged certain leases near Mt. Isa where it is believed uranium occurs.

Western Mining Corporation has also entered the uranium picture and has secured areas near Lalla Rookh, in the Marble Bar district, Western Australia. So far nothing of value has been discovered but prospecting is being carried out in other parts of the State. Western Mining Corporation and Gold Mines of Australia have come to an agreement whereby participation in all uranium activities shall be for the joint account of the two companies; the participation being in the ratio of 75 per cent to Western Mining Corporation and 25 per cent to Gold Mines of Australia.

ELECTRIC NICKEL SMELTING—I

Continuous Electric Smelting of Low Grade Nickel Ores

Although it stands as the largest consumer of nickel in the world, the United States produces virtually no nickel from domestic ores, and dependence upon outside sources and the increasing importance of nickel have focused attention of those deposits existing within the national boundaries. Research on the Cle Elum and Riddle ores from the U.S. deposits, as well as on certain ores from foreign sources, was begun nearly ten years ago and has continued ever since. In the following article, the first of two instalments, condensed from U.S. Bureau of Mines *Report of investigations 5201*, the structures of the ores tested are described together with the preliminary tests and electric smelting procedures, while in a further article the results of electric smelting and upgrading experiments by means of continuous selected reduction tests will be discussed.

The electric-smelting equipment comprises two furnaces designed and built at the Albany Station, except for the water-cooled electrode clamp-arm assemblies. Both furnaces are three-phase, round, open-top, with cable-suspended electrodes placed at the corners of an equilateral triangle. Provision was made for ready change of the electrode spacing. The two furnaces are backed by a common 1,000 kVA. Westinghouse transformer, the secondary busses of which may be connected in parallel or series. The transformer has six voltage taps, the series connection voltages being approximately twice those of the parallel connection. Both furnaces operate from a common operator's panel, electrode winches, and balanced-beam-type regulator panel.

The smaller furnace, designated ESA, is nominally rated at 100 kW. but has been operated at over 300 kW. with the transformer on series connection. This furnace was used in the continuous nickel-smelting tests. It employs 3 in. graphite electrodes, which generally were spaced with their centres 5½ in. from the furnace centre. The furnace has three tap holes at different levels, the lowest of which is intended to drain the hearth.

TEST FURNACES

For the smelting tests in the roofed furnace, two different designs were used. First, a ring 12 in. high with three lateral feeding chutes was placed on top of the furnace. The ring was first lined with silica brick, and the feeding chutes were lined with plastic monofirebrick. Later, the ring was lined with magnesite brick and the feeding chutes were rammed with periclase. In this furnace a large section of the electrodes was in the furnace, causing a high consumption of electrodes.

The larger furnace, designated ESB, employs 8 in. graphite electrodes and operates at 500 to 1,000 kW. The shell measures 96 in. in diameter and 78 in. in height. The top part is not removable. All other characteristics are the same as for the ESA furnace. Besides the described ESA and ESB furnaces, which are essentially smelting furnaces, other electric furnaces are available at the Albany Station, in which the first smelting tests were performed.

The size ST Lectromelt, Heroult-type, steel-melting arc furnace rated at 500 kW. was converted for use as an open-top smelting furnace in early smelting tests. The charging door was bricked up, and the roof was replaced by a spare roof ring, which was lined with refractory to increase the height of the furnace wall. After the ESA furnace was brought into operation the ST furnace was changed to its original design and used for refining tests. A single-phase arc smelting furnace of 200 lb. capacity and rated at 200 kW. with manual electrode control was used for exploratory batch tests. A single-phase size W furnace of 50 lb. capacity also is available for tests where applicable.

RAW MATERIALS

The Cle Elum deposit, about 60 miles east of Seattle and 26 miles north of Cle Elum, has been investigated, disclosing several million tons of measured and indicated ore averaging, in per cent: Fe, 42.7; Ni, .92; and Cr, 1.73. About 70 per cent of this tonnage has an average nickel content of 1.05 per cent, and the balance averages .62 per cent.

Petrographic examination of the ore revealed that the Cle Elum ore is a nickeliferous iron ore, which contains essentially magnetite, some haematite, chrome spinel, clay minerals, talc, diaspore, and minor amounts of quartz, plagioclase, chlorite, limonite, calcite, serpentine, carbonaceous matter, clinozoisite, amphibole (including glaucophane), and epidote. No discreet nickel minerals were observed. Spectroscopic examinations of concentrates indicate that essentially all of the nickel present is atomically combined with the magnetite, although minor amounts are evidently present in the serpentine and talc.

The Riddle nickel ore deposit is in south-western Oregon, and contains about 20,000,000 tons of indicated and inferred ore averaging 1.5 per cent nickel. Petrographic examination of the ore revealed the principle minerals to be limonite, antigorite, garnierite, chlorite, magnetite, talc, and pyrophyllite. Garnierite, a hydrous nickel-magnesium silicate, is the nickel mineral.

The Brazilian nickel ore from the Tocantins deposit, of which a 6 ton lot was received for smelting tests, is a garnierite-type ore similar to the Riddle ore, except for its copper and higher nickel content. The received sample analyzed, in per cent: Ni, 4.4; Fe, 12.1; Cr, 1.1; Co, .03; Cu, .42; Al_2O_3, 5.6; SiO_2, 45.6; CaO, 3.5; MgO, 10.9; S, .02; and P, .09. This ore was received crushed to minus 4 mesh.

Two samples of Cuban laterite and serpentine received and analyzed indicate that the Cuban laterite is similar to the Cle Elum ore, whereas the Cuban serpentine is more nearly similar to the Riddle ore, although its Fe content is appreciably higher.

FLUXES AND REDUCTANTS

Limestone and quartz used as fluxes were obtained from local sources and were of average commercial grade. Coos Bay coal was obtained and the char was produced by devolatilizing the coal in the rotary kiln. Roslyn coal was obtained from a mine in the vicinity of Cle Elum. Gasco briquettes consisted of petroleum carbon, and petroleum coke was of average grade and gave results comparable to those obtained using Gasco briquettes. The aluminium-ferrosilicon alloy (Al-Fe-Si), used as a possible slag scavenger, was minus 65 mesh.

	Fe	*Al*	*Si*	*F.C.*	*CaO*	*MgO*	*SiO_2*	*Al_2O_3*
Limestone ...					52.0	0.8	3.2	1.9
Quartz ...							96.0	
Coos Bay coal				44.6				
Coos Bay char				68.9				
Roslyn coal ...	0.88			46.3	1.03	.34	7.5	6.2
Gasco briquettes				98.7				
Petroleum coke				95.3				
Al-Fe-Si ...	30.1	12.2	55.6					
Hogged wood waste* ...				12.6				

* Average analyses

Sawdust used as reductant and for smelting control was obtained locally and was the same as that used for industrial and home heating. Hogged fuel, a mixture of chips, splinters and sawdust, later proved superior to sawdust.

Previous research on Cle Elum ore indicated the need for departure from normal electric-smelting practice. The first test on continuous smelting of Cle Elum ore in the ESA furnace was made in April, 1952. More tests were made in October, November and December, 1952, and January, 1953. All these tests were based upon experience gained in smelting Riddle ore by the dry-top technique, using hogged fuel as reductant, and were considered of exploratory nature to determine optimum conditions.

Before smelting research on Riddle ore was undertaken several nickel-extraction methods were tried with no apparent success. Subsequent electric-smelting research was done. Seventeen batch-smelting tests were made in the single-phase, 200 lb. arc furnace, employing magnesite, silica, and carbon hearths. After two single-shift continuous smelting tests in the modified ST Lectromelt furnace, batch testing of variables in smelting of Riddle ore was concluded with 13 tests in the 200 lb. arc furnace. Additional refining on crude Riddle metal included tests on the Perrin practice, employing lime-chromite slag, refining with oxygen, and refining with iron ore. All three methods showed promise but required further testing.

In April, 1951, the new 100 to 300 kW. three-phase, open-top smelting furnace was brought into operation and employed in smelting research of Riddle ore. Numerous continuous smelting tests were made in the magnesite-lined furnace with varying amounts of Coos Bay char as reductant. Limestone was used as flux in proportions of 30, 15, and 0 parts per 100 parts of ore. In the first 19 tests slag-resistance smelting technique was used ; in other words, the electrode tips were immersed in the slag. Two slag-resistance heats were made in the carbon-lined furnace followed by four heats using arc resistance with the electrode tips above the slag. Finally, in the series of preliminary tests, one arc-resistance heat was made on a magnesite lining.

RESULTS OF THE TESTS

Results of the preliminary tests indicate that low-carbon and low-silicon ferronickel was produced only from a carbon-deficient charge in magnesite-lined furnace by arc resistance smelting. Charges with a small excess of carbon produced a ferronickel with a high carbon and low silicon content. A high silicon, low-carbon ferronickel was produced from charges containing a large excess of carbon. Results of the tests show that a relationship exists between the silicon and the carbon contents of the alloy. With higher silicon content, the carbon content is lower, which leads to the conclusion that carbon is replaced by silicon.

Boiling and foaming conditions experienced in heats with carbon deficiency in the charges, made in carbon-lined furnace or using slag-resistance smelting technique, is believed to be caused by the reaction of the carbon from the lining or the electrodes with the oxides in the slag.

SMELTING PROCEDURES

The general procedures in handling ore, reductant and fluxes, slag and alloys were similar in all tests made in the ESA furnace. Portions of ore ranging from 100 to 300 lb. were weighed and mixed with the weighed amount of reductant and fluxes. Brazilian ore and Riddle ore were mixed with reductant in a large concrete mixer, but the Cle Elum ore charges were mixed by shovel on a concrete pad.

Several different materials were tried for botting up the tapholes. A mixture of crushed magnesite brick and periclase or straight periclase proved to be the best. Slag was sampled by dipping a slag spoon into the molten slag and pouring the spoon's content on to a clean graphite plate. Analytical results showed very good correspondence. During the Riddle and Brazilian ore tests the alloy was tapped into a 29 in. diameter geared ladle, which was lined with 4 in. of plastic firebrick. The slag tapped with the alloy was skimmed off, and then the remaining slag and alloy were pigged in 15 lb. cast iron pig moulds. The alloy samples were drilled from the middle pig.

Owing to the relatively larger amount of slag and a smaller alloy yield from the Cle Elum ore, taps were made more frequently and the alloy was tapped with the slag. The alloy collected in the lower part of the mould, whereas the slag remained on top. After freezing, separation was good and the alloy regulus was easily separated from the slag. Slag samples continued to be taken the same way. Whenever possible, a molten alloy sample was taken by dipping the spoon sample deep into the mould and pouring its content into an iron mould.

SMELTING INVESTIGATIONS

Three general types of smelting were investigated, dry-top, open-arc, and smelting in a roofed furnace. The dry-top technique was applied when smelting Brazilian nickel ore. During the tests on Riddle ore, dry-top smelting used in the beginning was later replaced by open-arc smelting. Most of the tests on Cle Elum ore were made under dry-top conditions. Only part of the last series of smelting tests was made in a roofed furnace.

Experience proved that low-grade nickel ores can be selectively smelted by the dry-top smelting method. However, certain requirements of the charges are indispensable to secure success. Hogged fuel proved to be of great value for dry-top smelting. The hogged fuel mixed with the ore and the flux not only provides the carbon necessary to reduce the ore but maintains a porous, non-conducting, insulating cover over the molten bath. The porous nature of the cover allows the gases formed by the reaction of the oxides with the carbon to escape constantly, preventing accumulation of gases in the furnace, which eventually causes violent blows, with consequent loss of dust and metal vapours.

Hogged fuel, being a poor conductor of electricity, prevents current from flowing from one electrode to the other through the charge ; this can result in inoperable furnace conditions. The current must flow between the electrode tips and the molten bath. On the other hand, hogged fuel, being a good insulator of heat, reduces heat losses when covering the molten bath. Increasing the amount of hogged fuel in the charge decreases the feeding rate of the ore into the smelting zone and raises the smelting temperature. In selective-reduction smelting the amount of hogged fuel is limited by the carbon requirement. Smelting in a roof-covered furnace established that selective reduction of Cle Elum or other similar ore using coke or coal as reductant without hogged fuel was also practical.

A 4 in. to 6 in. layer of ore and flux was placed on the hearth as a cushion, and the corresponding amount of crushed Gasco briquettes was placed on top of the ore-flux mixture. The roof was then placed on top of the furnace and the electrodes introduced into the furnace through the electrode clamps and holes in the roof. After a molten pool was established by arcing the crushed briquettes, the charges were added to the furnace through the feeding chutes.

The general procedure was to keep the electric arcs short and feed the charges to the furnace at a rate that kept the bath always covered with some unfused charge, thus protecting the sidewalls and the roof from direct arc radiation.

MANGANESE IN BOMBAY—II

Manganese in Southern Bombay State, India

The first portion of this article, which appeared in our last issue, outlined the activities of those manganese mining companies active in the northern section of Bombay State, India. In the concluding instalment, which appears below, the activities of those companies operating in the southern part of the State are described.

The Independent Trading Co., which holds a mining concession comprising 2,000 acres in the Talevadi area of Belgaum, is an affiliate of the Eastern Mining Co. and has begun working a mine in the area, 21 miles from Londa. Operations began in October, 1952, and an output of 2,000 tons monthly was expected by the end of 1953. The ore is a compact type and, having the same characteristics as the Joida ore, is described as "disintegrated reef deposits." Fifty per cent of the ore produced is medium-grade, 30 per cent high-grade, and 20 per cent low-grade. At present 200 workers on a contract basis are employed.

The Shri Ram Mining Co. obtained a prospecting licence for the Jamgaon mine, 18 miles from Londa, in April, 1952. The lease covers 6 deposits in an area of 640 acres. Deposits are mostly on the surface and in the immediate subsoil and are described by the lessee as "pocket ore in boulders and gravels." Without serious prospecting, the company estimates its reserves at 60,000 tons comprising 30 per cent high-, 30 per cent medium-, and 40 per cent low-grade ore. Monthly production is 400 tons with a labour force of 150.

NORTH KANARA

The most recent geological survey of manganese deposits in the North Kanara district was made by K. C. Channabasappa, of the Geological Survey of India, who estimated reserves of manganese ore to constitute 500,000 l.tons of all grades.

The Eastern Mining Co. operates four mines in south Bombay State, the Titwali, 13 miles from Londa, Kurandi, 13 miles from Londa, Usoda, 22 miles from Londa, and Pardhani, 37 miles from Londa.

The Titwali mine consists of four deposits of which two are being worked, and which consist of pocket ore floating in irregular directions. In some places there are outcrops, but in other places the ore pockets are 15 to 20 ft. underground. Mining is with pick axes and crow bars, and the ore is separated from waste dirt, broken into small pieces, and graded. A monthly production of 1,000 tons of ore is extracted by 60 workers using no equipment. Mining is confined to eight months of the year and the mine is flooded during the rainy season.

The Kurandi mine was previously prospected by Killick Nixon and Co. and then abandoned. The main deposit in this 80 acre concession shows evidence of reef formation consisting of high-grade ore and also pyrolusite of 94 per cent purity. The mine is open-pit and worked by blasting and hand tools. Considerable development is being undertaken to expose the orebody. Production in 1953 was expected to be 6,000 tons for the eight months of production. The four deposits are worked by 70 workers, and monthly production averages 600 tons. If the reef deposits are traced to any significant extent, the company plans modern mechanization of the mine.

The Usoda mine consists of seven deposits in an area of 460 acres, the character of the deposits being the same as in Titwali. Iron ore also is found in the mine but is not worked owing to the uneconomic costs of production. The mine, employing 160 workers on a contract basis, produces 7,000 tons of ore annually. Larger production is hampered by the Government Forest Department's reluctance to grant permission to clear the forest area for mining. All three grades of ore are produced, 30 per cent high-grade, 30 per cent medium-grade, and 40 per cent low-grade.

The Pardhani mine consists of four deposits in an area of 840 acres in which pocket and boulder deposits are found. Prospecting by digging trenches is under way in the area to determine the scope for mechanization. At present 200 workers, employed on a contract basis, produce 1,000 tons of ore monthly by opencast methods using simple hand tools. In 1953, production was expected to be 10,000 tons for the eight working months. The ore is about 60 per cent medium-grade, 30 per cent low-grade, and 10 per cent high-grade. The phosphorus and silica contents are low and the ore, though predominantly medium-grade, is blended with ores from other areas.

OTHER OPERATORS

Bapusaheb Tilve and Sons operate the Shiroli and Castle Rock deposits, 38 and 18 miles respectively from Londa. Both consist of opencast pocket deposits operated by hand, utilizing a few hand tools. Work at the Shiroli deposit has progressed to about 60 ft. below ground level, but mining at Castle Rock is a surface operation. Annual production at Shiroli is 5,000 tons and Castle Rock 3,000 tons, extracted during the eight months of clement weather. The ores are high-grade with about 30 per cent medium- and 30 per cent low-grade.

Near the end of 1952 Shamalsha Girdhari and Co. secured a prospecting lease for the Khodli mine comprising 400 acres containing deposits in pockets. Mining was scheduled to begin in April, 1953, and production for the year was placed at 2,000 tons. The ore is 40 per cent high-grade, 40 per cent medium-grade, and 20 per cent low-grade, 40 per cent medium-grade, and 20 per cent low.

B. H. Mehta Co. have obtained a prospecting lease to operate mines in four areas, Ivoli Ghotagi, Khodli, Vilya, and Kalumbuli in North Kanara district. The Ivoli Ghotagi mine is the only one operating, but the other three are expected to be opened shortly. The Ivoli Ghotagi lease covers 400 acres in which pocket deposits containing all grades of ore (40 per cent high-grade, 30 per cent medium-, and 30 per cent low-grade) are found. Present monthly production is 250 tons, with a labour force of 60. A total of 2,500 tons was expected from the four mines in 1953.

OPERATIONS IN JOIDA

Lalbhai Patel Co. has mining leases for a group of four mines in Joida, 26 miles from Londa. Of these only one is being worked, although the other three are expected to begin operations in 1954. The Joida mine area comprises 1,100 acres 2,000 to 3,000 ft. above sea level, and the deposits are described as "disintegrated reef." In several places the orebody appears as an outcrop and in others there is evidence of the orebody dipping several feet below the surface. Mining is open pit and compressors, drills, bulldozers, and hand tools are used. The ore requires considerable dressing before grading, which is done by rotating pieces of ore in a steel drum inset with sharp spikes on its inside surfaces. Considerable prospecting and development is being undertaken by the company, and as a result of sinking trial pits and drill shafts, ore reserves are estimated at 1,000,000 to 1,500,000 tons. The mine is producing 5,000 tons of ore monthly with a labour force of 800.

Orientated Diamond Drill Bits—II

In last week's issue, the first portion of this article discussed tests carried out by the United States Bureau of Mines in the orientation of diamond drill bits. In the final instalment appearing below, tests carried out by certain companies in the United States are described as well as investigations on cube shaped diamonds.

While the research work discussed in the first part of this article was based on experiments conducted under closely controlled conditions, another publication (A. E. Ross, A. E. Long, 1953) gives the practical experience of Sprague and Henwood Inc. It clearly indicates that setting in hard-vector directions is feasible and reduces drilling costs. In these tests 4,000 powder metal orientated bits were set and used, and the report gives results covering a portion of these. The procedures used in orientating the diamonds were based on methods by A. E. Long and C. B. Slawson (1952).

A few orientated bits were tested under field conditions in 1950. Five pairs of diamond coring bits were made, identical as to diamond quality, size, carat weight, bit type, matrix, crown contour and waterways. Diamonds were orientated in hard-vector directions in one bit of each pair and set at random in the other. Each orientated bit drilled 27.4 ft. costing $.595 per ft. drilled with .055 ct. diamond loss. Random set bits drilled 9.2 ft. each, at $1.460 bit cost and .133 ct. loss per ft.

First Test Bits

	Random-set	*Orientated*
No. of bits tested	5	5
Total ft. drilled	46	137
Ft. drilled per bit	9·2	27·4
Total diamond loss, ct.	6·10	7·59
Diamond loss per ft. drilled, ct.	0·133	0·055
Bit cost per ft. drilled	$1·460*	$0·595*

* Includes cost of diamonds consumed, resetting, and blanks.

Additional personnel had to be trained to produce sufficient orientated diamond bits for field tests on a wide cross section of rock types and drilling conditions. A new series of test bits, paired as before, was sent out in 17 groups, consisting of 6 to 12 pairs per shipment. Different diamond types and grades were used, but the majority were medium grade boart, 10 to 15 stones per ct.

TESTS IN HARD ROCK

Solid and broken formations were drilled, ranging from shales to granitic gneiss, and some bits subjected to abuses, *e.g.* drilling over broken core and tramp iron. All 272 bits were salvaged by January, 1953.

Second Test Bits

	Random-set	*Orientated*
No. of bits tested	129	143
Total ft. drilled	2773	4381
Ft. drilled per bit	21·5	30·6
Total diamond loss, ct.	354·53	338·08
Diamond loss per ft. drilled, ct.	0·012	0·008
Bit cost per ft. drilled	$1·05	$0·66*

* Does not include charge for extra time required to orientate diamonds in setting.

Average figures showed that orientated bits drilled 30.6 ft. each, cost per ft. drilled being $.66 with .008 ct. loss. Random set bits drilled 21.5 ft. each at $1.05 bit cost per ft. drilled and .012 ct. loss.

Several difficulties prevent full use being made of the better performance of orientated bits. Orientation requires skill, a long training period and consequent high wages, in addition to taking longer than random setting. So far, bit orientation has been largely confined to diamonds larger than 20 per ct., though smaller stones are preferred in many drilling operations. With further experience the range of suitable sizes may be extended to diamonds as small as 40 per ct. Within the present size limitation, a large proportion—though not all—of new diamonds can generally be orientated, though this is reduced when diamond shapes are altered by wear or surface features obscured by a dark coating. Suitable stones, therefore, are likely to become costly.

Only if the problems connected with bit orientation are solved can the average diamond user hope to purchase orientated bits at a reasonable price.

BIT PERFORMANCE IN COAL FORMATIONS

Officials of Hoffman Bros. Drilling Co., also following the report of A. E. Long and C. B. Slawson (1952), experimented with the orientation of diamonds in bits, and since January, 1953, only bits with diamonds orientated in the hard-vector direction are being manufactured. The following table presents data for NX bits with beryllium-nickel matrices, cast-set with medium grade diamonds of 6 to 10 per ct. size. The drilling was done in coal formations, i.e. in sedimentary rocks for which large-stone bits were most suitable. Additional setting charges become necessary, of course, increasing in inverse ratio to the size of the stones, but the report claims that these are greatly offset by savings.

Summary of results for NX bits

	*Random-set**	*Orientated**
No. of bits tested	46	40
Total ft. drilled	7340	7693
Total diamond loss, ct.	118·78	65·58
Diamond loss per ft., ct.	0·01618	0·00852
Diamond loss per bit, ct.	2·58	1·64
Average footage per bit	159·6	192·3

* In sedimentary rock, broken limestone and in strip-drilling coal.

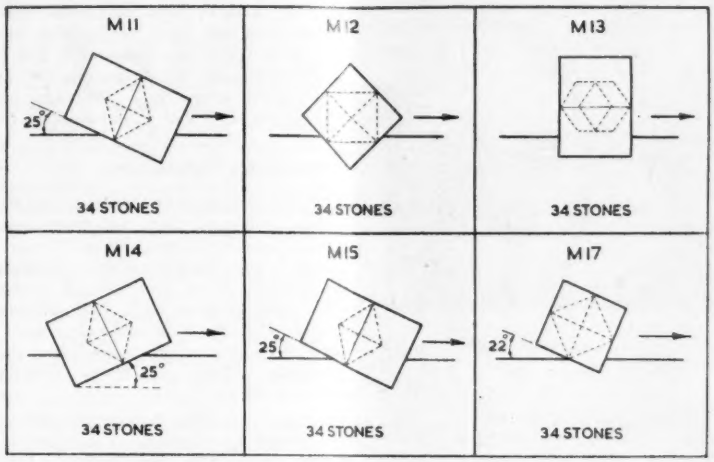
E. P. Pfleider investigated octahedron shape diamonds set in various directions (1952) but continued these investigations with cube-shaped diamonds. Seven bits were set with cube-shape diamonds about 10 stones per ct. in size, the stones being of nearly perfect cubic form and easily orientated. Five orientations were tested, using the Hy Mac hydraulic drill unit, EXT diamond core bits and drilling St. Cloud pink granite.

CUBE FACE DIAMONDS

Bits M-11 and M-15 tested a positive rake off the cube face, with the cube corner or point leading. This orientation gives a cutting force of diamond on rock more ore less normal to the octahedral cleavage, and is preferred for octahedral diamonds. But with cube diamonds the points wore down rapidly and tended to form polished flats, with a resulting decrease in penetration rate. On reaching a critical pressure, one or more of the diamond points failed, destroying some of the gauge diamonds. The result was a high, but short-lived advance rate between 13 to 15 ft. for M-11 and 8 to 10 ft. for M-15. Footages were 18.7 and 15.3, and the overall advance rate the same.

Bit M-14 was set with diamonds having a point orientation and the cube corner trailing, and therefore a positive rake off the octahedral cleavage plane. The corners of the stones started to cleave off in the first ft. of break-in drilling, in accordance with previous experience with similar orientation of octahedron diamonds. The trailing edge tended to cleave away, followed by the formation of polished flats ahead of the broken edge and a rapid decrease in bit performance and advance.

Bit M-12 had an on-edge orientation, with the edge normal to the cutting direction. Contact was parallel to the hard direction of a dodecahedral face. The orientation should be structurally strong, except for a weakness along the dodecahedral cleavage. Indications of diamond breakage and erratic performance occurred early on, breakage becoming accentuated at about 11.5 ft. Abrasion and polishing of diamonds followed. Overall performance was approximately the same as for bits M-11 and M-15.



Orientation of cube shaped diamonds

Bit M-13 tested the on-edge orientation with the edge parallel to the direction of motion, comparable to drilling along the soft direction of a dodecahedral plane. Diamond chipping and breakage occurred early during the test, giving high rates of advance, possibly because an edge was sweeping around a circle of small radius, causing torsional forces to act along it. Flats were formed by chipping, followed by abrasion, polishing and a rapid decline in bit performance. Drilling characteristics and advance were very similar to bit M-15.

Bits M-16 and M-17 were set with the stones on edge, this being parallel to the radii drawn from the bit centre. The orientation is similar to M-12, but the diamond is at 22 deg. negative rake off the dodecahedral plane, giving a positive rake off the cube face. This results in a strongly backed orientation and fast drilling characteristics. A long cutting edge is combined with a structurally strong orientation, a gouging or planing action in drilling and diamond wear along the hard direction off the dodecahedral face. Over twice the advance rate of the other bits was obtained, i.e. 37.2 and 35.6 ft. respectively. Drilling performance was uniform, with slow, gradual abrasion or chipping of the exposed edges and little fracturing or breakage of individual diamonds, in spite of fine hair-like cracks and other points of incipient weakness. Eventually the edges chipped or abraded to a degree at which increased surface contact would not permit sufficient penetration of individual diamonds to maintain the set minimum rate of .3 to .5 in./min. at the maximum thrust of 1,595 lb.

Cube shaped diamonds do not require the compromise setting for increased bit life and drilling rate and decreased diamond wear required for octahedral diamonds. Diamond loss after salvage was .0028 ct./ft. for bit M-17 and .0148 ct./ft. for M-16, as one diamond broke and fractured others just before the end of the run. All diamonds from these two bits could be re-used. The cube shape has the advantage of having eight similar edges for resetting.

The cube-shaped Congo industrial diamond appears superior to the Congo octahedron for drilling rate, footage and diamond loss, as it presents well supported cutting edges at 90 deg. angles. The octahedron has points with acute 70 deg. angles which are weak and break easily or edges with 110 deg. angles which are unsuitable for rock penetration.

DIAMOND WEAR AND TEST RESULTS

Diamond wear with orientated cube diamonds. Congo — Cubes 9 to 10 per carat 34 stones (26 crowns: 8 "Kickers") with powdered tungsten - bonding alloy

EXT Bits	*M-11*	*M-12*	*M-13*	*M-14*	*M-15*	*M-16*	*M-17**
Ft. drilled	18·68	16·96	14·93	13·72	15·27	37·20	35·62
Diamond wt. in ct.							
Original	3·76	3·76	3·48	3·50	3·58	3·50	3·53
Final	3·36	3·37	3·16	3·28	3·19	3·15	3·43
Salvage (re-usable)	3·07	2·99	3·07	3·21	2·72	2·95	3·43
Diamond loss in ct.							
Net from wear	0·40	0·39	0·32	0·22	0·39	0·35	0·10
Total after salvage	0·69	0·77	0·41	0·29	0·86	0·55	0·10
Performance ct./ft.							
Net from wear	0·0213	0·0230	0·0214	0·0161	0·0255	0·0028	
Total after salvage	0·0369	0·0453	0·0274	0·0212	0·0148	0·0028	

* Same as M-16

Comparison of test results for diamond bits having orientated Congo stones of cube and octahedron shape

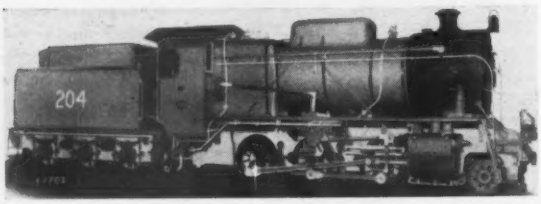
Operations	*Octahedron Bits M-1/M-9*	*Cube Bits M-11/M-17*
Min. ft. drilled per bit	4·0	13·7
Max. ft. drilled per bit	21·5	37·2
Average ft. drilled per bit	12·1	21·8
Av. drill rate, all bits, in./min.	0·5	0·65
Av. drill rate, bits with preferred orientation, in./min.	0·9	1·2
Max. diamond loss, ct./ft.	0·086	0·056
Min. diamond loss, ct./ft.	0·012	0·003
Diamond loss, bits with preferred orientation, ct./ft.	0·030	0·009

MACHINERY AND EQUIPMENT

Locomotives for Spanish Mines

Six locomotives have been supplied by Robert Stephenson and Hawthorns, Ltd., to the Rio Tinto Company, Ltd., for service at the latter's mines in Spain. The locomotives are designed to draw loads of 295 tons at 10 m.p.h. and 350 tons at 5 m.p.h. on a 2 per cent grade.

The locomotives are of 3 ft. 6 in. gauge and are of type 2-6-0 superheated with tender. The two cylinders are of 17 in. diameter by 24 in. stroke and the wheels coupled have a diameter of 3 ft. 6 in. The total wheelbase is 17 ft. 9 in., and the weight of the locomotive in working order is 51.5 tons.



One of the six locomotives supplied to the Rio Tinto Company for its mines in Spain

The boilers are of the Belpaire type with welded inner firebox and steel tubes, fitted with superheater equipment. Boiler mountings include the Vacuum Brake Company's 19 m.m. S.J. (P) type combination ejector, Ross safety valves, Klinger KD water level gauges, "Everlasting" blow down cock and Gresham and Craner self-acting underfootplate ejector. Boiler pressure is 200 lb. p.s.i.

The locomotive frames are of steel plate and manganese liners are fitted to horn guides and axleboxes. The tractive efforts of each unit at 85 per cent WP is 28,074 lb. Tenders have wheels of 3 ft. diameter, with 3,100 gal. tank capacity and 5½ tons coal capacity. They weigh 33½ tons in working order. Thus the total weight of engine and tender in working order is 85 tons. The total length of the two units, over buffers, is 47 ft. 4¼ in.

Rubber and Plastic Conveyor Belting

Presented by the manufacturers, Barrow Hepburn and Gale, Ltd., as a cheap and effective type of conveyor belting for mine and quarry use, the Mitcham brand of rubber and canvas conveyor belting is claimed as swift and resistant to impact, as well as providing a minimum power consumption and the ability to deliver uniform amounts of material at controlled speeds.

Particular attention is paid during construction to the canvas body wherein lies the intrinsic strength of the belt, and belts produced by the manufacturers are normally made from 28, 32, 36 or 42 oz. duck. Stripped plybelts are also manufactured. Rubber covers are compounded according to the grade required. In the A grade belt the tensile figures are in the region of 3,700 lb. p.s.i. with an elongation of 550 per cent, and adhesion of rubber to plies is 24 to 26 lb. The B grade belt has a tensile strength of 3,000 lb., elongation of 450 per cent and ply adhesion of 20 to 22 lb.

Research into the damage caused to belts by sharp and abrasive materials has led to the development of the Mitcham Cushion Belt. The cushion surrounds the canvas body and is vulcanized to it, providing a resilient shock absorber between the carrying and pulley faces and the actual body. A particular cushion belt showed, under test, an average tensile strength of 4,000 lb. p.s.i., an average elongation of 695 per cent, a ply adhesion of 28 lb. per in. width, and an average adhesion of cushion to body of 26 lb. per in. width.

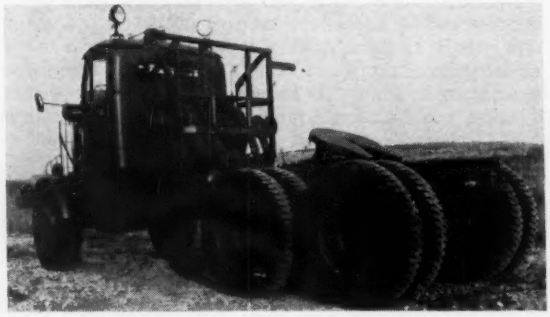
"Plyastic" fire-resisting belt is made from standard 32 oz. duck which, after being impregnated with a P.V.C. compound, is produced as a conveyor belt having .035 in. of plastic cover on each side. These fire-resisting properties provide safe operation in mines and collieries where risk of fire exists, the plies, cover and edges being welded into one solid piece. Adhesion between plies is 28 lb.

Although the nature of the material transported and the tonnage carried has a marked effect on the maximum speed of a belt, a conservative estimate shows the recommended maximum speeds for Mitcham belting to be 300 f.p.m. at 12 in., 14 in. or 16 in. belt width, 350 f.p.m. at 18 in. or 20 in. belt width, 400 f.p.m. at 22 in. or 24 in. belt width, 450 f.p.m. at 26 in. or 30 in. belt width, 500 f.p.m. at 32 in. or 36 in. belt width, and 550 f.p.m. and 600 f.p.m. at 42 in. and 48 in. belt width respectively. Mitcham conveyor covers are made in grades A, B and C and heat resisting.

Vehicles for Oilfield Use

The latest type of vehicle to be ordered by the Shell Petroleum Company, Ltd., for operational use in the oilfields in Venezuela, Colombia, Seria (British Borneo), and Indonesia, is the 6-wheeled 6-wheel drive Constructor, supplied by Messrs. Scammel Lorries, Ltd. The Constructor chassis will operate in these oilfields with different wheelbases to suit several types of body work and equipment. All have been adapted to the special requirements and the total order covers 38 vehicles and the first of 14 for Venezuela left the U.K. on March 10.

The Constructor now being supplied has many features, including a wheelbase of 15 ft. 9 in. for operation in conjunction with heavy duty semi-trailers. This unit has a Darlington model 80 winch and special reversing drive utilizing the six speeds of the gear box, which enables the winch to be operated in a forward or rearward rotation whilst the vehicle is moving in either direction. The tyre equipment is 13.00 x 24 in. all round with twins on the rear axle.



The Scammel 6 x 6 Constructor chassis

These vehicles are powered with the Rolls Royce C6.NFL 6-cylinder diesel engine or, for less arduous conditions, the Meadows 6DC-630 6-cylinder diesel engine. The 6-speed main gear box and the transposing box affords 12 forward speeds and two reverse speeds. Each axle is of the double reduction spiral bevel epicyclic type and each is driven by an independent propellor shaft. The rear bogie and the suspension is located by torque arms and radius links, affording full articulation whilst relieving the springs of all driving and brake reactions or twisting effects. The manufacturers claim that the units give an effective performance under cross-country conditions.

A Tong Loader for Longwall Faces

A device, developed at Middleton Broom Colliery, near Leeds, for gathering cut and blown coal on longwall faces, consists of two side plates, 5 ft. long by 1 ft. high, hinged at one end to a wedge-shaped head, and connected by toggle bars to a central traction bar which runs freely through the wedge head. To the ends of this traction bar are connected

the main and tail ropes of a double drum haulage unit, the tail rope passing from the head end of the bar, round a return wheel at the end of the face, and back to the haulage.

When the tail rope is pulled the arms close and the tongs are pulled into the loose coal. Upon reversal, and pulling with the main rope, the arms are forced open by the toggle bars, collect all loose coal in their path, and carry it to the delivery point. As at present designed, the loader gathers about 8 cwt. of coal on each run, but the size can be adjusted to suit local conditions.

A Fabricated Pipework Skip Hoist

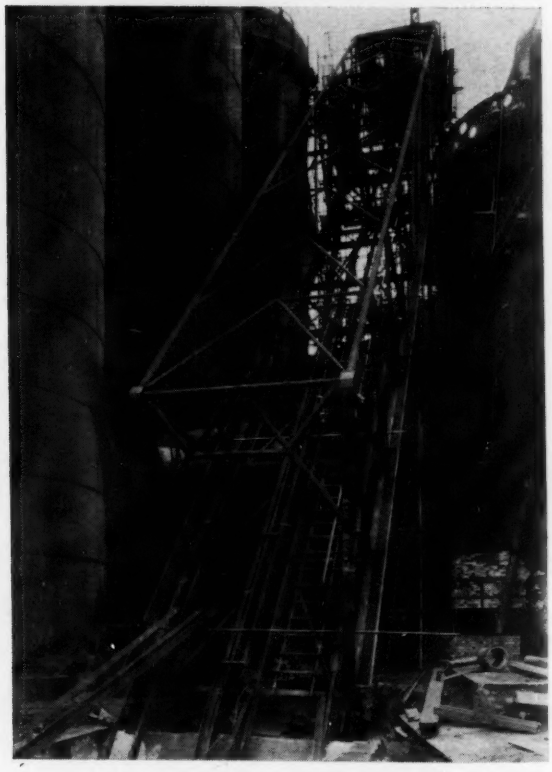
Tubular constructions have gained an increasing use in modern engineering application, and *The Tubewright*, a new film published by Stewarts and Lloyds, Ltd., now outlines the progress in both manufacturing techniques and the uses of tubular steel. The high strength to weight ratio of hollow structural members is demonstrated with marked success in this instructive and enjoyable film, and despite the fact that steel tubes as structural members have been used in heavy industry in many applications, a most interesting use from the point of view of the mining engineer is in the construction of a skip bridge at Bilston Iron and Steel Works.

In this example of fabricated pipework construction, a new blast furnace was needed at a spot where an existing skip bridge was footed. A considerable engineering problem arose owing to the fact that two blast furnaces were to be maintained in operation while the existing skip bridge was demolished, the work involving the erection of a new skip bridge by a method which would allow this principle to be followed.

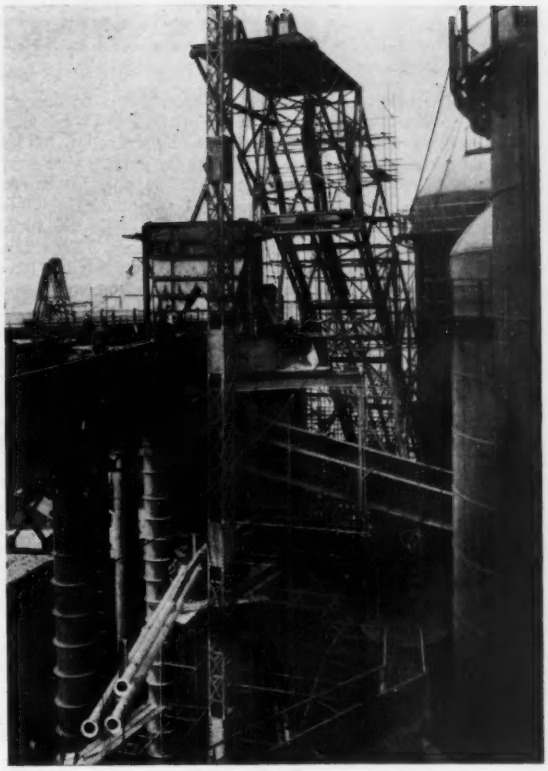
The answer was found to lie in the vertical fabrication of the tubular framework, which allowed for speedy construction. This in turn presented as few limitations to output as was possible under the circumstances. This entire structure was welded with the exception of top and bottom pins, and some of the welds had to be run 80 ft. above ground level.

It took only a few months for the new skip bridge to be in operation for blast furnace charging.

It may be recalled that the jib of the Ransome and Rapier W1400 walking dragline, described in *The Mining Journal* of November 9, 1951, was constructed of steel tube in order to emphasize the weight requirements of the bucket.



The skip bridge being threaded between stoves and furnace



A view of the skip hoist platform from the wheeling platform

Tubular steel thus provides many applications, from the lighter structures (such as racks and frames of all types manufactured by Tubewrights, Ltd., a subsidiary company, and which may be visualized as fulfilling a need in the larger mine storeroom) to the impressive bridges already constructed in various places in the United Kingdom and the cranes and other equipments used in heavy industry.

A Versatile Industrial Compressor Unit

A pedestal-mounted compressor unit, the 200 SAS, is now in quantity production by The Hymatic Engineering Company Ltd. With a displacement of 5.25 c.f.m. at 750 r.p.m. and a working pressure of 100-150 p.s.i., the 200 SAS may be incorporated as initial equipment or as an optional extra on tractors, special vehicles, machine tools and powered plants of all kinds for such duties as pneumatic greasing, the operation of pneumatic tools, braking systems, jigs and fixtures and other compressed air applications. When necessary the unit may also be operated at 1,000 r.p.m. to give a displacement of 7 c.f.m. against a working pressure of 100 p.s.i.

The single 200 c.c. capacity, high-duty cast iron cylinder, bore 2.67 in. and stroke 2.16 in., is of the single-stage type heavily finned so that in conjunction with the finned cast aluminium cylinder head and the generous inlet and outlet ports, a consistently low delivery temperature is maintained. Weighing 38 lb. complete, the unit absorbs about 1 h.p. at 750 r.p.m.

Summer School in Mineral Dressing

A Summer School in Mineral Dressing will be held in the Bessemer Laboratory, Royal School of Mines, Prince Consort Road, London, S.W.7, from Tuesday, September 14 to Friday, September 17, 1954. The course includes lectures covering comminution, classification, grinding control, gravity separation, flotation and ancillary processes and is illustrated by films, demonstrations and class work.

METALS, MINERALS AND ALLOYS

COPPER.—American producers are reported to be concerting a big reduction in the output of the metal in view not only of the apparent industrial recession, but in preparation for the important additions to be expected during the current year from new mines opened with government price support. It is estimated that the Anaconda and Kennecott subsidiaries in Chile have reduced current monthly output from the 29,500 s.tons obtaining in the latter part of last year to about 20,700 s.tons. At the same time U.S. domestic production is computed to have been reduced to some 14,500 s.tons a month, and the world output to have been cut from 206,000 to 182,500 s.tons monthly—with consumption estimated at 175,000-185,000 s.tons monthly.

What the attitude of the Chilean authorities will eventually be to these cuts is yet to be learned, although formal applications for curtailment have so far been rejected. However, as there is a large surplus of Chilean copper still unsold, possibly of the order of 80,000-100,000 tons, as well as the current monthly production, they will probably not have much option but to agree to them. It is not so very long ago that concerted action by U.S. producers to cut production in order to maintain prices would have invited the attention of the Department of Justice under the anti-trust Acts, but we cannot see the U.S. Administration moving in this direction to-day.

As regards new mines coming into production during the current year, Anaconda's Yerington property is said to be already producing at the rate of 33,000 s.tons yearly, while the A.S. and R.'s Silver Bell is expected to follow before the end of June with an annual rate of 18,000 tons. Soon after that, the Phelps Dodge Lavender Pit is due to commence production at the annual rate of 38,000 tons, to be followed by the White Pine property with 35,000 tons annually in October and Miami's Copper Cities property ready to produce at the rate of 32,500 tons by the end of the year. These additions will, it is estimated, contribute some 12,000 s.tons a month to the U.S. domestic supply, unless prices should fall to a figure below the government's guaranteed floor price of from 22 c. to 25½ c. per lb.

The Chilean Government has announced that 10,000 tons of its copper stocks have been sold in Great Britain at the world market prices with payment to be made in sterling. Other countries, like Germany, are also reported to be in the market but on a barter basis.

It is understood that an agreement has been reached for increasing the railway freight for the transport of copper from the Copperbelt to the port of Beira by 30 per cent. Decline in railway revenues is said to have led to a widespread demand for a general increase in rail charges.

LEAD.—On Thursday of last week the St. Joseph Lead Co. raised their price to 13¾ c. N.Y., at which price a good consumer demand resulted. The rise was largely inspired by the expected stockpiling purchases in America.

U.S. consumption in January was 88,700 s.tons against 83,708 s.tons in December. Shipments of automotive replacement batteries for the first two months of the year are well above the figures for the corresponding period of 1953 and 1952. The future of the automobile trade in the States, however, is still considered uncertain.

ZINC.—The advance in the U.S. lead prices is said to have given the market a somewhat firmer tone, but the quotation is again unchanged at 10.25 c. E. St. Louis. A fairish demand from consumers continues, but there was no major feature.

It is reported from Japan that price reductions are under consideration, due to expanding output and the tight money situation.

TIN.—The tin market maintains its volatile character and at the beginning of the week the price of cash rose £18 5s. per ton to £754-£755 and three months gained £9 £719-£720, increasing the premium in cash to £35. Subsequently prices went higher (see Metal Exchange report).

In the U.S. the advance was not followed, partly on account of the end of the N.Y. dock strike and partly because the London advance seemed overdone. The price on Wednesday was 95 c. per lb.

The following are the Tin Study Group's production figures for the first two months of the year:

Country	*February 1954*	*Jan.-Feb. 1954*	*Jan.-Feb. 1953*
Belgian Congo	404	696	2,174
Bolivia*	2,268*	2,268*	1,470*
Indonesia	2,247	4,792	4,712
Malaya	4,277	9,385	9,305
Nigeria	635	1,354	1,591

* Figures relate to January only.

The most notable feature is the Congo output which at 696 tons compares with 2,174 in the corresponding period a year ago.

Bolivian exports in January are given as 2,268 tons as compared with 1,470 tons in the first two months of last year. The Bolivian Government was said to have authorized the Banco Minero to pay "remunerative prices" and to encourage the production of tin, wolfram, antimony, copper, gold, asbestos and sulphur to maintain production in private mines and to avoid unemployment.

ALUMINIUM.—According to Alcoa's development division, the automobile industry is expected to play an important part in the expansion of aluminium consumption to the U.S. Present consumption per car is estimated at about 20 lb. but already an average of 125 lb. is forecast for the not too distant future. On an output of 6,000,000 automobiles a year consumption might expand to some 300,000 s.tons. Increased use is expected not only in engines, but in transmission, radiators, electrical equipment, brakes, and general trim.

Secondary aluminium smelters in the U.S. are much exercised by the heavy exports of scrap, especially to Japan and West Germany and this has caused an advance in price of secondary alloys. In consequence secondary smelters are requesting remedial action.

U.S. production of primary aluminium in February is reported by the Aluminium Association at 110,483 s.tons, an increase of 20 per cent over February a year ago.

The new Norwegian aluminium plant at Sunndalsora is expected to begin operations this month although full production may not be achieved until next year owing to delays with the hydro-electric plant. The capacity is rated at around 40,000 tonnes a year, which will be additional to the current output of some 52,000 tonnes. Most of the cost has ben supplied by a loan from the American E.C.A. to be repaid in aluminium deliveries.

According to a report by the President of Pechiney, French exports were trebled last year by sales to Britain and the U.S. Domestic demands had been slow up to the fourth quarter, but then revived, and orders have been booked for the whole output for the first half of the current year and over a portion of the second.

The Australian Commonwealth Minister of Supply stated earlier in the week that the Tasmanian aluminium plant would be put into commission next January. Projected output is 13,000 tons of ingots annually, sufficient for Australia's present needs.

MAGNESIUM.—The Dow Chemical Company have made cuts in their price of magnesium sheet and plate, ranging between 5 per cent and 28 per cent. The demand for magnesium is said to have increased sharply and with these lower prices it is hoped the metal will be more competitive with aluminium.

QUICKSILVER.—The U.S. price of quicksilver was further advanced at the beginning of the week to $212 to $215 per flask. The London price has also advanced and yesterday stood at £77½.

TUNGSTEN.—The Korean Tungsten Company has ordered all mines in Korea to shut down, with the expiration of the Korean-U.S. Tungsten Agreement on March 31. World prices recently were only a third of what the U.S. was paying under the Agreement. Over 4,000 miners are said to have been laid off. Partly no doubt as the result of this shut-down and partly as a result of consumer restocking as the price bottomed last

month, the Ministry of Materials again advanced its selling price from Tuesday last to 165s. per l.ton unit and of scheelite to 160s. In the U.S. the price was advanced at the beginning of the week to $18-20 per s.ton unit.

GOLD.—A Senate banking sub-committee had under review last week several Bills relating to gold. These variously proposed a restoration of the pre-1933 gold standard; convertibility of paper dollars and gold coins; the establishment of a free domestic market; and an increase in the official gold price of $35 per oz. The Deputy Treasury Secretary, Mr. Burgess, and the chairman of the Federal Reserve Board both spoke against the proposals, which they regarded as a desirable achievement one day, but they saw no advantage to be gained by their adoption at the present time, and thought that the U.S. should defer consideration until other major countries were ready to do so also. Mr. Burgess believed that gold released in the U.S. might simply be hoarded and become a tool for international speculators.

The speakers have since been reminded by the Press that they accepted the appointment from an Administration which promised in its platform a return to a redeemable currency. At present however, gold, as the policeman of the politician, can hardly expect a welcome from the same Administration.

Iron and Steel

Still enjoying almost complete immunity from the causes which have set back the rate of production in Western Europe and precipitated a pronounced recession in the U.S.A., the iron and steel industry of Great Britain is in a flourishing condition. On this occasion the hesitations which usually develop in the pre-Budget period has been so slight as to be almost imperceptible. A key note of confidence was sounded in the Government's Economic Survey for 1954, and the twin targets of the steel industry are the further development of productive capacity and the expansion of exports.

To that end export premiums have been severely pressed and in the case of merchant bars have been abolished altogether, whilst home prices have been kept unchanged although under inflationary pressure. Of the export trade the best that can be said is that it has not declined, but the home market is brisk and buoyant. Blast furnace capacity is fully extended to keep pace with the swollen demand for pig iron. About 70 per cent of the total output comprises basic iron for the steel plants yet still more is wanted and completion of new blast furnaces is being pressed forward with all possible speed. Haematite production is fully absorbed and only foundry iron is still freely obtainable. (Merchants claim to be delivering bigger turnovers of ferrous scrap, but it is noticeable that since November last reserve stocks have been reduced by over 50,000 tons and are still falling.) Ample tonnages of British steel series are now available and this has led to a very severe curtailment of imports. The almost total loss of the British market for billets, sheet bars and slabs is viewed with all the greater concern by Continental producers since there is every indication that this is a permanent change and not merely a temporary phase.

The London Metal Market

(From Our Metal Exchange Correspondent)

The outstanding feature of the week has been the sharp rise in the price of tin which has been accompanied by very good turnovers. The rise has been brought about by increased consumer interest on both sides of the Atlantic, which has been accompanied by the realization that the conclusion of the Agreement in respect of the third year of the Indonesian/American contract will retard the surplus production having an effect on world prices. There have also been rather more optimistic rumours about the possibilities of consumer countries signing the Tin Agreement. On Thursday morning the Eastern price was equivalent to £738¾ per ton c.i.f. Europe.

Interest in lead and zinc has been almost non-existent, and, as can be expected under such circumstances, prices have tended to drift downwards. The technical position of lead, however, is such that the backwardation is likely to remain at, or above, its present level throughout the month.

The copper market has been filled with rumours about sales of Chilean copper, but in spite of this prices have been maintained owing to good demand on the Continent and the reluctance of producers to sell forward metal at any reasonable discount from the quotation for spot material. For instance, most producers are still asking the equivalent of 29¾ c. per lb. f.a.s. for May shipment. There is no doubt that the sales which the Chileans have made in recent weeks to the U.S., the U.K., and some other European countries have gone a long way towards easing their foreign exchange position, and, therefore, they are no longer so interested in disposing of metal at a price below to-day's level. In fact, it can be said that the future of the copper price is more bound up with the overall financial position of Chile than with any statistics dealing with the metal itself.

Closing prices and turnovers are given in the following table:—

	April 2		April 9	
	Buyers	*Sellers*	*Buyers*	*Sellers*
Tin				
Cash	£732½	£737½	£762½	£765
Three months	£705	£706	£727½	£728½
Settlement	£737½		£765	
Week's turnover	280 tons		630 tons	
Lead				
Current month	£93½	£94	£92½	£92½
Three months	£91½	£91¾	£90¾	£91
Week's turnover	6,000 tons		3,825 tons	
Zinc				
Current month	£79¾	£80½	£79	£79½
Three months	£78½	£78¾	£77½	£78
Week's turnover	4,600 tons		4,975 tons	
Copper				
Cash	£233	£234	£236½	£237½
Three months	£227	£227½	£228¾	£229
Settlement	£234		£237½	
Week's turnover	5,800 tons		5,950 tons	

OTHER LONDON PRICES — APRIL 8

ANTIMONY

English (99%) delivered, 10 cwt. and over .. .. £210 per ton
Crude (70%) .. .. .. £200 per ton
Ore (60% basis) .. .. .. 22s./24s. nom. per unit, c.i.f.

NICKEL

99.5% (home trade) .. .. £483 per ton

OTHER METALS

Aluminium, 99.5%, £156 per ton
Bismuth (min. 4 cwt. lots) 16s. lb.
Cadmium (Empire), 13s. lb.
Chromium, 6s. 5d./7s. 6d. lb.
Cobalt, 20s. lb.
Gold, 248s. 10½d. f.oz.
Iridium, £55 oz. nom.
Magnesium, 2s. 10½d. lb.
Manganese Metal (96%-98%) £225/£262
Osmiridium, £40 oz. nom.
Osmium, £50 oz. nom.
Palladium, £7 10s. oz.
Platinum, £30/£31
Rhodium, £43 10s. oz.
Ruthenium, £23 oz.
Quicksilver, £77.10s. ex-warehouse
Selenium, 35s. 9d. nom. per lb.
Silver 73⅛d. f.oz. spot and 73½d. f'd.
Tellurium, 15s./16s. lb.

ORES, ALLOYS, ETC.

Bismuth .. .. 60% 8s. 3d. lb. c.i.f.
50% 7s. 3d. lb. c.i.f.
Chrome Ore—
Rhodesian Metallurgical (lumpy) £14 5s. 6d. per ton c.i.f.
" " (concentrates) £14 5s. 6d. per ton c.i.f.
" " Refractory £13 17s. 6d. per ton c.i.f.
Baluchistan Metallurgical .. £15 19s. 6d. per ton c.i.f.
Magnesite, ground calcined .. £26-£27 d/d
Magnesite, Raw .. .. .. £10 - £11 d/d
Molybdenite (85% basis) .. 102s. 4d.-103s. per unit c.i.f.
Wolfram (65%) .. .. .. World buying 160s. nom.
" " .. .. .. 165s. U.K. Selling
Scheelite (65%) .. .. .. World buying price nom.
" " .. .. .. 160s. U.K. Selling
Tungsten Metal Powder (98% Min. W.) .. .. 14s. 3d. nom. per lb. (home)
Ferro-tungsten .. .. .. 11s. 3d. nom. per lb. (home)
Carbide, 4-cwt. lots .. .. £35 13s. 9d. d/d per ton
Ferro-manganese, home .. .. £53 10s. 0d. per ton
Manganese Ore Indian c.i.f. Europe (46%-48%) .. .. .. 7s. 4d. - 7s. 9d. per unit
Brass Wire .. .. 2s. 4½d. per lb. basis
Brass Tubes, solid drawn .. 1s. 8⅛d. per lb. basis

THE MINING MARKETS

(By Our Stock Exchange Correspondent)

Contrary to usual form, stock markets proved buoyant prior to the budget. The rise of $102,000,000 in the gold reserves of the sterling area during March and the strength of sterling abroad helped this trend. After the budget, prices were marked down as a precautionary measure, but rapidly recovered on the appearance of buyers. While there must naturally be some individual disappointment with the Chancellor's proposals, the budget is obviously financially sound and healthy for the country's economy. Clearly, no risks have been taken for the sake of political popularity.

Kaffirs spent the week digesting the March returns and this led to rises in Consolidated Goldfields, West Rand Investment Trust and Johnnies. A much healthier atmosphere was reported on the Johannesburg Stock Exchange. There was more confidence in the future and locally it was hoped that reductions in taxation will lead to prosperity and a higher level of investment.

Individual mines were influenced by the returns, but in some cases much less than expected. Randfontein rose despite the loss on gold production. Hopes of excellent uranium figures ran high. Western Reefs hardened following the report, but many of the older mines lost ground. The promising results from Doornfontein and Blyvooruitzicht Gold Mining had little influence on share prices.

The Orange Free State section was again the main centre of interest although there was a tendency to tail off towards the end of the period. There was some speculation in the Freddies Group at their lower price level. The steady progress of St. Helena and its continually increasing profits contrasted favourably with results from the above mines and Welkom. This was reflected in the share price. Geoffries, Ofsits and President Brand also returned to favour. News concerning Virginia and Merriespruit was received from the Kennecott report. This American company has considerable interest in both mines. It is anticipated that production on an initial scale of 50,000 tons a month will begin at Virginia in the first half of 1954. Work has also started on the uranium plant. The No. 1 shaft on Merriespruit was equipped last year and the sinking of No. 2 shaft, temporarily postponed, will be resumed during 1954. The shares of both companies advanced on the news.

Business in the West African market was quiet but there was a firmer undertone. Leaders hardened where changed. Ashanti recorded a sharp gain following the excellent development result on the 35th level. In one cross-cut, values of 151 dwts. over 15.5 ft. were obtained. It is a curious fact that results such as this in the O.F.S. market would probably send the share concerned "through the roof." Konongo rose due to favourable press mention.

Diamond shares improved sharply. So far the American recession appears to have had little effect upon sales.

Coppers were better, taking in their stride higher local rail charges in Rhodesia and the sale of 10,000 tons of Chilean copper in the United Kingdom. Helping factors here were the improvement in the commodity price and the lower Chilean output. Roans responded to the ending of the strike on the property. Tanks were again a good market on continental buying.

Eastern tin shares were quiet despite the better cash price for the metal. Pengkalen, however, achieved an outstanding jump due to a Press tip, and buying on a narrow market. In the Nigerian section, changes were unremarkable, although most columbite producers were slightly harder. Beralts improved on the better tungsten price.

Lead/zinc shares altered little. Rhodesia Broken Hill, however, rose, on the announcement of plans to overcome the lower commodity prices by higher production. Another good feature in this section was San Francisco Mines. Asbestos shares and Consolidated Murchison attracted buyers and Canadian shares were better, especially for base metals. The poor Hollinger figures depressed the share price.

FINANCE	Price April 7	+ or — on week
African & European	2 7/16	—1/16
Anglo American Corpn.	6½	—¼
Anglo-French	18/9	+6d
Anglo Transvaal Consol.	21/3	—3/9
Central Mining (£1 shrs.)	29/6	+3d
Consolidated Goldfields	50/-	+1/3
Consol. Mines Selection	29/4½	.....
East Rand Consols	3/-	—1½d
General Mining	3 13/16	—1/16
H.E. Prop	38/9	.....
Henderson's Transvaal	7/9	+3d
Johnnies	45/9	+2/9
Rand Mines	3¼	—1/16
Rand Selection	34/4½	—7½d
Strathmore Consol.	31/3	—1/3
Union Corp. (2/6 units)	30/-	+6d
Vereeniging Estates	4 11/16	+1/16
Writs	36/3	+9d
West Wits	43/1½	+7½d
RAND GOLD		
Blyvoors	36/9	+6d
Brakpan	10/3	—3d
City Deep	17/6	—7½d
Consol. Main Reef	18/9	.....
Crown	41/3	.....
Daggas	3 1/16	+1/16
Doornfontein	26/6	+6d
Durban Deep	37/6	.....
E. Daggas	13/3	—3d
E. Geduld .. (4/- units)	30/-	+6d
E. Rand Props	2⅛	.....
Geduld	3⅛	.....
Govt. Areas	12/9	—3d
Grootvlei	22/6	+4½d
Libanon	12/6	—3d
Luipaards Vlei	23/9	+3d
Marievale	19/3	.....
Modderfontein East	15/-	.....
New Kleinfontein	16/10½	—7½d
New Pioneer	13/9	—3d
Randfontein	67/-	+4/6
Robinson Deep	17/-	+6d
Rose Deep	14/3	—3d
Simmer & Jack	4/10½	—1½d
S.A. Lands	24/4½	—7½d
Springs	4/7½	—1½d
Stilfontein	28/1½	+1½d
Sub Nigel	40/-	—7½d
Van Dyk	5/3	—6d
Venterspost	13/9	.....
Vlakfontein	16/-	—3d
Vogelstruisbult	35/9	+6d
West Driefontein	6	+1/16
W. Rand Consolidated	2 11/16	+1/16
Western Reefs	56/3	+1/9

O.F.S.	Price April 7	+ or — on week
Freddies	7/3	+6d
Freddies N.	7/7½	+7½d
Freddies S.	7/7½	+7½d
F. S. Geduld	4½	—¼
Geoffries	15/-	+1/3
Harmony	31/6	—6d
Loraine	11/3	.....
Lydenburg Estates	16/3	—3d
Merriespruit	12/7½	+10½d
Middle Wits	14/1½	+4½d
Ofsits	51/3	+1/3
President Brand	51/3	+1/9
President Steyn	33/6	.....
St. Helena	24/9	+3d
Virginia Ord.	13/4½	+4½d
Welkom	19/9	+6d
Western Holdings	4⅛	—1/16
WEST AFRICAN GOLD		
Amalgamated Banket	1/7½	+1½d
Ariston	5/9	+1½d
Ashanti	21/1½	+2/3
Bibiani	4/7½	+6d
Bremang	2/-	.....
G.C. Main Reef	3/6	+1½d
G.C. Selection Trust	6/3	.....
Konongo	2/7½	+3d
Lyndhurst Deep	1/-	.....
Marlu	1/6	.....
Taquah & Abosso	2/7½	+1½d
AUSTRALIAN GOLD		
Boulder Perseverance	2/9	.....
Gold Mines of Kalgoorlie	12/6XD	—4½d
Great Boulder Prop.	8/3XD	.....
Lake View and Star	13/3	—3d
Mount Morgan	17/-	.....
North Kalgurli	7/-	—1½d
Sons of Gwalia	6/1½	—1½d
South Kalgurli	7/-	.....
Western Mining	11/3	+3d
MISCELLANEOUS GOLD		
Cam and Motor	9/3	—1½d
Champion Reef	4/4½	.....
Falcon Mines	7/7½	+4½d
Globe & Phoenix	22/6	.....
G.F. Rhodesian	5/3	—1½d
London & Rhodesian	4/4½	+1½d
Motapa	2/-	.....
Mysore	4/6	.....
Nundydroog	5/4½	.....
Ooregum	3/6	.....
Oroville	16/4½	—1½d

MISCELLANEOUS GOLD (contd.)	Price April 7	+ or — on week
St. John d'El Rey	20/9	—3d
Zams	34/3	+3d
DIAMONDS & PLATINUM		
Anglo American Inv.	5½	+1/16
Casts	25/-	+1/6
Cons. Diam. of S.W.A.	5	.....
De Beers Defd. Bearer	81/3XD	+2/6
De Beers Pfd. Bearer	16½	—¼
Pots Platinum	8/9	.....
Watervaal	13/6	+3d
COPPER		
Chartered	69/9	+1/10½
Esperanza	7/4½	—1½d
Indian Copper	4/6	.....
Messina	3⅛	—1/16
Nchanga	7 11/16	+1/16
Rhod. Anglo-American	52/7½ XD	+1½d
Rhod. Katanga	13/3	.....
Rhodesian Selection	16/9	+9d
Rhokana	20½XD	—¼
Rio Tinto	23 1/16	—1/16
Roan Antelope	17/-	+7½d
Selection Trust	37/3	+4½d
Tanks	72/3	+1/9
Tharsis Sulphur Br.	57/6	+3/9
TIN (Eastern)		
Ayer Hitam	25/6	—3d
Gopeng	8/1½XD	.....
Hongkong	7/9	—3d
Ipoh	16/3	.....
Kamunting	8/3	.....
Kepong Dredging	4/9	.....
Kinta Tin Mines	10/6	.....
Malayan Dredging	26/-	—3d
Pahang	13/7½	—1½d
Pengkalen	8/9	+1/3
Petaling	8/1½	+3d
Rambutan	15/-	.....
Siamese Tin	8/3	.....
Southern Kinta	16/6	+6d
S. Malayan	24/4½	+4½d
S. Tronoh	8/9	.....
Sungei Kinta	11/-	.....
Tekka Taiping	6/-	+3d
Tronoh	22/3	+3d
TIN (Nigerian and Miscellaneous)		
Amalgamated Tin	14/-	+1½d
Beralt Tin	24/9	+1/9
Bisichi	6/-	+1½d
British Tin Inv.	14/6	—3d
Ex-Lands Nigeria	3/3	+1½d

TIN (Nigerian and Miscellaneous) contd.	Price April 7	+ or — on week
Geevor Tin	11/-	—3d
Gold & Base Metal	3/6	.....
Jantar Nigeria	9/1½	+1½d
Jos Tin Area	13/3	.....
Kaduna Prospectors	2/4½	.....
Kaduna Syndicate	2/4½	.....
London Tin	6/-	—1½d
United Tin	3/3XD	—1½d
SILVER, LEAD, ZINC		
Broken Hill South	2 11/16	+1/16
Burma Mines	2/6	.....
Consol. Zinc	30/7½	+7½d
Lake George	7/6	—3d
Mount Isa	37/6	.....
New Broken Hill	24/3	—6d
North Broken Hill	2 1/16	.....
Rhodesian Broken Hill	10/6	+1/1½
San Francisco Mines	23/1½	+2/4½
Uruwira	3/10½	+1½d
MISCELLANEOUS BASE METALS & COAL		
Amal. Collieries of S.A.	42/3	.....
Associated Manganese	46/-	+9d
Cape Asbestos	26/3	+1/1½
C.P. Manganese	58/9	.....
Consol. Murchison	42/6	+1/3
Mashaba	4½	.....
Natal Navigation	2 1/16	.....
Rhod. Monteleo	1/9	.....
Turner & Newall	16/-	+1/9
Wankie	13/3	.....
Witbank Colliery	3 1/16	.....
CANADIAN MINES		
Dome	$29½XD	.....
Hollinger	$24	—¼
Hudson Bay Mining	$79	.....
International Nickel	$68¾	+¼
MiningCorpn. of Canada	£4½	+1/16
Noranda	$121	+2
Quemont	£6½	—¼
Yukon	3/9	.....
OIL		
Anglo-Iranian	11¾	+¼
Apex	46/3	.....
Attock	44/4½	.....
Burmah	80/-	+2/6
Canadian Eagle	31/3	+3d
Mexican Eagle	20/1½	—1½d
Shell (bearer)	5⅞	.....
Trinidad Leasehold	20/3	+1/-
T.P.D.	24/9	+3d
Ultramar	29/6	+1/9

COMPANY NEWS AND VIEWS

Rand and O.F.S. Returns for March

Higher tonnages sent to the mill by Rand and O.F.S. producers in March reflect the increased number of working days over the short month of February. This has enabled costs to be decreased and in many cases higher working profits are reported. But these factors do not reflect the whole picture and it is particularly noteworthy to record that better results have been obtained despite a lower gold price which was 247s. 9d. per f.oz. against 248s. in February and 248s. 2d. in January.

Company	March, 1954 Tons (000)	Yield (oz.)	Profit (£000)	Yr. ends	Current Financial Year Total to Date Tons (000)	Yield (oz.)	Profit (£000)	Last Financial Year Total to Date Tons (000)	Yield (oz.)	Profit (£000)
Gold Fields										
Doornfontein	50	14,998	66·0	J	229	66,929	224·5	—	—	—
Libanon	97	19,915	53·2	J	792	161,891	416·9	738	147,604	375·8
Luipaards Vlei	110	20,934	43·9	J	956	177,782	368·4	911	171,701	438·3
Rietfontein	28	6,311	24·4	D	81	18,285	71·0	78	17,409	76·2
Robinson Deep	95	20,425	24·5	D	281	78,691	63·8	286	53,566	37·1
Simmer & Jack	129	20,642	11·7	D	379	60,717	39·4	365	58,906	41·3
Sub Nigel	66	21,945	97·6	J	596	197,530	901·2	592	203,590	1030·3
Ventersdorp	113	25,984	59·6	J	955	223,693	516·3	913	212,917	548·8
Vlakfontein	38	13,706	72·7	D	113	40,424	214·8	107	39,244	210·8
Vogels	103	25,651	107·2	D	304	76,455	320·2	276	69,993	277·8
West Drie	47	35,322	284·2	J	405	296,612	2393·1	265	176,121	1348·4
Anglo American*										
Brakpan	113	19,672	21·5	D	329	57,493	55·8	336	60,058	57·2
Daggas	219	51,040	314·9	D	636	148,595	909·1	656	155,252	1018·8
East Daggas	93	15,808	46·2	D	278	47,279	139·5	260	45,656	144·1
S.A. Lands	100	18,333	53·4	D	293	53,873	155·1	299	54,329	158·8
Springs	130	18,269	7·1	D	387	54,413	24·1	443	61,268	38·4
Welkom	68	13,420	2·0	D	186	37,452	L 6·3	167	32,832	40·6
Western Hldgs	42	14,734	40·0	D	137	44,103	130·1	—	—	—
West Reef Ex.	115	22,796	66·5	D	332	66,077	194·7	318	65,689	246·7
Central Mining										
Blyvoor	102	59,498	470·1	J	880	518,487	4190·8	924	557,611	4739·6
City Deep	168	31,800	18·0	D	483	92,702	56·3	472	91,610	76·5
Cons. M.R.	175	25,820	26·5	J	1486	210,400	183·4	1598	223,503	218·0
Crown	284	45,165	48·1	D	793	128,237	141·6	776	125,240	112·7
D. Roodepoort	180	30,193	52·1	D	515	85,109	141·7	537	92,303	245·9
East Rand Prop.	196	44,592	115·3	D	560	128,126	337·9	545	119,354	295·1
Modder B.	58	6,104	2·5	D	169	17,436	8·1	159	17,510	7·6
Modder East	117	13,446	13·0	J	1017	116,581	121·6	1037	119,813	188·1
Rose Deep	72	11,127	12·5	D	200	30,976	35·5	215	31,757	17·1
Welgedacht	34	4,256	2·1	J	302	36,999	23·1	303	37,483	40·2
J.C.I.*										
E. Champ d'Or.	26	2,340	L22·9	D	70	6,909	L 45·8	76	12,436	11·2
Freddies N.†	33	6,264	L15·1	D	87	16,489	L 48·3	—	—	—
Freddies S.†	40	6,151	L15·1	D	109	16,368	L 47·4	—	—	—
Govt. G.M.A.	275	34,624	30·1	D	765	98,045	90·1	726	98,151	180·3
Randfontein	318	41,182	L20·1	D	835	119,411	30·7	920	119,395	90·4
Union										
East Geduld	141	43,010	316·0	D	389	119,583	870·6	400	119,996	887·2
Geduld Prop.	93	15,212	26·4	D	266	43,331	73·1	293	45,440	97·4
Grootvlei	185	39,306	220·5	D	522	111,329	618·0	545	116,889	698·5
Marievale	66	16,681	71·0	D	188	47,654	202·7	178	44,088	195·3
St. Helena	80	17,658	50·3	D	230	50,832	148·9	181	36,063	49·7
Van Dyk	82	14,176	2·1	D	234	40,724	7·8	274	44,125	17·4
General Mining*										
S. Roodepoort	28	6,141	21·3	J	247	53,697	182·4	243	55,461	208·3
W. Rand Cons.‡	230	30,506	185·5	D	647	85,014	513·4	672	94,995	299·4
Anglo Transvaal										
N. Klerksdorp	11	—	L 0·9	D	32	—	L 3·7	31	4,126	3·4
Rand Leases	172	29,211	36·3	J	1441	247,660	157·3	1559	263,863	425·4
Village M.R.§	33	—	9·6	J	307	—	105·7	304	47,592	128·8
Others										
Ellaton Gold	27	7,586	34·6	D	71	17,471	49·3	—	—	—
N. Kleinfontein	109	13,474	16·0	D	315	39,682	52·1	318	41,158	87·0
Nigel Gold	26	4,096	L 2·1	D	83	12,996	L 5·6	95	14,074	5·9
Spaarwater	10	2,671	0·9	D	31	7,813	0·6	31	7,064	L 9·5
Stilfontein	78	25,078	136·0	D	226	71,354	378·4	174	46,207	206·3
W. Nigel	17	3,832	8·9	J	155	34,978	75·1	151	—	68·7

Notes.—Profit figures are in all cases figures of working profit excluding profit from sale of gold at premium prices. In cases of groups marked with an asterisk(*) profit includes sundry revenue. Profit figures preceded by L indicates a loss.
† Excluding development expenditure
‡ Including £165,000 from sales of uranium
§ Underground fire March 3 and 4 resulting in a loss of £2,371

Freddies Consolidated Mines

Further details have now been announced of the proposed merger of Freddies North Lease Area and Freddies South Lease Area.

A new company is to be formed and will be known as Freddies Consolidated Mines, having an authorized capital of £17,500,000 in £1 shares. The proposal is that the new company, Freddies Consolidated Mines, will take over the assets of Freddies North and Freddies South and will assume all the liabilities of both companies, which amount to approximately £4,500,000 in each case—apart from the 5 per cent loan stock.

At the same time, Freddies Consolidated will issue 4,060,784 shares of £1 each to Freddies North, and 4,142,354 £1 shares to Freddies South at 25s. per share. Freddies North and Freddies South will be placed in liquidation and the above share distribution by Freddies Consolidated will be made to shareholders in the ratio of one new Freddies Consolidated for every three Freddies North or Freddies South held.

As previously announced, the outstanding loan of £3,500,000 made to each company jointly by Johnnies, Anglo American Corporation and De Beers Investment Trust, are to be be funded into shares and from the details now available it is revealed that this operation is to be carried out on the basis of 25s. per £1 Freddies Consolidated share. Thus, the £7,000,000 loan involved will be met by the issue of 5,600,000 £1 shares in Freddies Consolidated.

With regard to the position of the loan stock holders, they will be offered the right either to take payment for their stock in cash at £102½ per cent, or they can convert into Freddies Consolidated shares on the basis of 41 shares for every £50 of loan stock held. This conversion offer would, therefore, be on the same basis as the funding of the short term debt. If the amalgamation scheme is approved at the extraordinary general meetings of Freddies North and Freddies South to be held early in June, it is proposed that Freddies Consolidated will make a new issue of shares to holders *pro rata* to their existing holdings, which will provide a net amount of about £2,100,000.

Vaal Reefs Offer 4-for-3 at 16s. 8d.

Vaal Reefs Exploration and Mining has announced that its new issue of 5s. shares will take the form of a 4 for 3 offer at 16s. 8d. per share.

In accordance with the company's flotation agreement, Western Reefs and the Anglo American Corporation of South Africa will be offered the right to subscribe for a total of 300,000 new shares of 5s. each, at the same price as the shares are being offered to shareholders, namely 16s. 8d. per share.

The issue, which will involve 4,000,000 shares, has been underwritten by the Anglo American Corporation for a cash commission of 2½ per cent on the issue price. The offer is being made to shareholders registered at the close of business on April 9.

According to a circular to shareholders issued with the annual report covering the year ended December 31 last, the Vaal Reefs has been sampled to the extent of 1,285 ft., averaging 92.4 dwt. over 5.3 in., equivalent to 487 in. dwt., up to the end of February last. Of the total sampled 1,175 ft., equal to 91.4 per cent, proved payable and averaged 99.6 dwt. over 5.26 in., equivalent to 524 in. dwt.

Marlu Gold Pays 5 Per Cent

Marlu Gold Mining Areas, the West African gold producer, in a preliminary profit statement has recommended the payment of 5 per cent per 5s. unit for the year ended September 30, 1953. This was the company's first distribution since 1940/41 when 10 per cent was paid.

Subject to completion of the audit, operating profits expanded from £48,011 to £124,551, and after providing for the 5 per cent dividend, which required £55,000, the carry forward was £125,799 compared with £57,425 brought in.

Marlu has maintained its all round improvement during the current year and at the end of the first six months the monthly production returns issued by the company reveal a cumulative profit to the end of March last of £80,700 compared with £79,200 in the corresponding period of the year under review.

Major Gen. W. W. Richards is chairman. The report and accounts will be posted towards the end of next week and the meeting has been provisionally arranged for May 6.

Good Diamond Sales in March Quarter

The good diamond sales effected through the Central Selling Organization during the first three months ending March 31, 1954, amounting to £16,655,064, do not bear out Sir Ernest Oppenheimer's forecast in June, 1953, that boom times have come to an end.

Indeed, the industrial diamonds sold during the March quarter, 1954, were the highest achieved in any quarter since the three months ended September 30, 1952, when the sales of industrial stones totalled £5,353,927.

Sales of both gems and industrials effected through the C.S.O. during the past five quarters are shown below.

Quarter	*Gems*	*Industrials*	*Totals*
March, 1953	£14,507,190	£4,066,018	£18,573,208
June, 1953	£8,792,258	£4,084,716	£12,876,974
September, 1953 ...	£9,303,346	£4,833,746	£14,137,092
December, 1953 ...	£10,733,315	£4,835,352	£15,568,667
March, 1954	£11,773,849	£4,881,215	£16,655,064

Rhodesian Corporation Maintains Dividend on Lower Earnings

Rhodesian Corporation, in a preliminary profit statement, have recommended the payment of a final dividend of 5 per cent making, with the interim payment of 2½ per cent, a total distribution for the year ended September 30, 1953, of 7½ per cent, the same as was paid in the preceding year.

Year to Sept. 30	*Working Profit*	*Taxation*	*Net Profit*	*Dividend Distribution*		*Carry Forward*
	£	£	£	£	%	£
1953	26,860	1,592	25,268	39,722	7½	29,102
1952	67,672	3,325	64,347	38,500	7½	43,556

The dividend is payable to shareholders registered as at April 30 and warrants will be posted on June 10.

Mr. L. C. Walker is chairman. Meeting, London, June 10.

THE ANGLO-FRENCH EXPLORATION COMPANY, LIMITED

The 64th Annual General Meeting of the Anglo-French Exploration Company Limited was held on April 2 in London.

The Chairman, **Mr. F. R. Cottell, A.C.A.,** in the course of his speech said:—

Our investments stand in the books at £990,859 and are valued at £1,215,103, an excess of £224,244. The classification of our investments based on the valuation at December 31, 1953, is:—

Gold Mining (including holding companies which have substantial interests in gold mining companies)	63.0%
Oil	13.7%
Copper, lead, zinc	8.0%
Tin	8.0%
Coal	7.0%
Miscellaneous	0.3%

In the profit and loss account it will be observed that our dividend income continues to rise and I would mention that the year's figure of £82,322 is the highest recorded since this item was first entered in our accounts at the gross amount, which was in 1941. This is particularly satisfactory in that we have substantial interests in gold mining companies on the Far West Rand and in the Orange Free State which either have not yet reached the dividend paying stage or have not attained full productive capacity. The prospective dividends from these interests should enable us at least to maintain our revenue from investments despite some probable falling off in the return from our base metal interests. The profit for the year, after taxation, is £33,320 against £31,938 in 1952. A dividend for the year of 7½ per cent is recommended.

Despite the hopes which were current last year that steps would be taken internationally to raise the dollar price of gold and to bring the paper currencies of all members of the International Monetary Fund more into line with their real value in terms of gold, it appears that the United States Authorities are still firmly disposed to ignore the fact that the paper dollar is worth only one-half of its pre-war value in terms of commodities. The inadequacy of world gold reserves in relation to the dollar value of international trade has been clearly demonstrated in a report prepared for the International Monetary Fund by Mr. Roy F. Harrod, entitled "Imbalance of International Payments." It follows, in order that full convertibility of currencies may be attained, that effective steps must eventually be taken to increase world gold reserves and this can only be done by raising the dollar price of gold. It is understood that representations in support of such action have been made to the United States Authorities by Mr. Butler, Chancellor of the Exchequer, while Mr. Havenga, South African Finance Minister, has been a consistent advocate of a higher world price for gold. We must continue to hope that too long a delay will not occur before this urgently needed step is taken.

By the end of 1953 23 gold mining companies in the Transvaal and the Orange Free State had entered into contracts with the Atomic Energy Board of South Africa for the sale of uranium. Stockholders will be interested to learn that the major proportion of this company's direct investment in South African developing or operating gold mines is in companies which are in this category of prospective uranium producers.

Apex Mines, Limited, had a successful year, achieving an increase in working profit and dividends declared. Operations at the properties of The Rooiberg Minerals Development Company, Limited, continued to expand and despite a fall in the average price realized for its tin concentrates in comparison with the previous year, the company was able to pay satisfactory dividends.

The net profit, after tax, of Apex (Trinidad) Oilfields, Limited, for the year ended September 30, 1953, was £584,206; the dividend was increased from 2s. 3d. tax free, per 5s. stock unit, to 2s. 6d. free of tax.

I regret that I am unable to report any satisfactory progress in the resumption of normal operations by Anglo-Burma Tin Company, Limited. Owing to the continuance of disturbed conditions in the company's area the output from the mine continues to be but a fraction of what could be achieved by full-scale working. There has been a suggestion by the Burma Government of a joint working arrangement with tin mining companies in Lower Burma but this matter is still in the very early exploratory stages.

The report and accounts were adopted.

ANGLO AMERICAN CORPORATION OF SOUTH AFRICA, LIMITED

(Incorporated in the Union of South Africa)

MINING COMPANIES' REPORTS (abridged) for year ended 31st December, 1953

(All companies mentioned are incorporated in the Union of South Africa)

BRAKPAN MINES LIMITED

CAPITAL: Authorised and Issued—£1,150,000 in 4,600,000 Shares of 5s. each, fully paid.

Tons milled....1,377,000. Yield (per ton, 3.58 dwt.) ...246,290 oz.

Income and Expenditure Account	£	Appropriation Account	£
*Revenue (per ton milled 44/11.9)	3,097,922	Union Government Income Tax	40,674
Working Costs (per ton milled 40/4.1)	2,777,502	Provincial Tax	179
		Government Share of Profits under Mining Lease	23,845
Working Profit (per ton milled 4/7.8)	320,420	Dividends No. 81 of 6d. per share and No. 82 of 6d. per share	230,000
Sundry Revenue less Expenditure	77,209	Directors' Special Remuneration	7,500
Total Profit	397,629	Appropriation for Capital Expenditure	47,829
Add—		Balance unappropriated at December 31, 1953	338,869
Balance to credit of Appropriation Account at December 31, 1952	186,529		
Silicosis Outstanding Liabilities Trust Fund —refund	4,738		
Amount previously Appropriated for Standard Stock now written back	100,000		
	£688,896		£688,896

* Working revenue includes £45,697 in respect of the premium arising from the sales of gold at enhanced prices for industrial and artistic purposes.

ORE RESERVE (based on pay limit of 3.6 dwt.) (1952—3.4 dwt.):

	Tons	Stope Width (inches)	Stope Value (dwt.)	Inch-dwt.
1952	3,925,600	43.91	4.66	205
1953	3,547,600	44.76	4.66	209

The value of the ore mined from the Reserve in 1953 was 4.60 dwt.

DEVELOPMENT :—

Footage Advanced	Footage Sampled	Percentage Payable	Average reef width (inches)	Average assay value (dwt.)
62,747	45,870	28.1	49.68	14.90

Included in the above development is footage accomplished on the footwall reef which totalled 11,884 feet, of which 8,705 feet was sampled, 42.8 per cent being payable, averaging 17.49 dwt. over 89.42 inches.

CAPITAL EXPENDITURE.—During the year under review expenditure under this heading on shaft sinking, development and equipment amounted to £38,502; it is estimated that expenditure for the current year will total £5,000.

SPRINGS MINES LIMITED

CAPITAL : Authorised and Issued—£2,527,500 in 10,110,000 Shares of 5s. each, fully paid.

Tons milled....1,735,000. Yield (per ton, 2.75 dwt.)....238,895 oz.

Income and Expenditure Account	£	Appropriation Account	£
*Revenue (per ton milled 34/7.5)	3,003,842	Union Government Normal Tax	1,250
Working Costs (per ton milled 32/10.1)	2,848,914	Provincial Tax	250
		Government share of Profits under Mining Lease	9,226
Working Profit (per ton milled 1/9.4)	154,928	Appropriated for Capital Expenditure	2,068
Sundry Revenue, less Expenditure	4,792	Capital Issue Expenses	6
		West Springs, Ltd., Forfeited Dividends—Paid	7
Total Profit	159,720	Dividend No. 63 of 1¼d. per share	63,188
Add—		Dividend No. 64 of 1¼d. per share	63,187
Balance to credit of Appropriation Account at December 31, 1952	317,566	Directors' Special Remuneration	4,280
Outstanding Liabilities Trust Fund—refund	1,808	Balance unappropriated at December 31, 1952	435,632
Amount previously appropriated for Standard Stock now written back	100,000		
	£579,094		£579,094

* Working revenue includes £42,824 in respect of the premium received from the sales of gold at enhanced prices.

ORE RESERVE (based on pay limit of 3.1 dwt.) (1952—2.9 dwt.):

	Tons	Stope Width (inches)	Stope Value (dwt.)	Inch-dwt.
1952	3,327,500	43.51	4.37	190
1953	2,764,100	43.51	4.61	201

The Reserve includes ore on the Kimberley Reef Series, which totalled 35,000 tons, averaging 3.15 dwt. over a width of 46.73 inches. The value of the ore mined from the Reserve in 1953 was 4.41 dwt.

DEVELOPMENT :—

Footage Advanced	Footage Sampled	Percentage payable	Average reef width (inches)	Average assay value (dwt.)
27,717	23,740	35.7	16.23	30.52

Reference was made in last year's report to the fact that operations on the Kimberley Reef horizon were confined to stoping, and that tonnage from this source was on a diminishing scale. It is anticipated that all work on the Kimberley Reef will be completed during the current year.

DAGGAFONTEIN MINES, LIMITED

CAPITAL : Authorised—£2,000,000. Issued—£1,750,000 in 7,000,000 Share of 5s. each, fully paid.

Tons milled....2,609,500. Yield (per ton, 4.70 dwt.)....613,874 oz.

Income and Expenditure Account	£	Appropriation Account	£
*Revenue (per ton milled 59/1.6)	7,715,034	Union Government Income Tax	1,367,073
Working Costs (per ton milled 28/6.2)	3,720,317	Provincial Tax	1,626
		Government share of Profits under Mining Lease	706,330
Working Profit (per ton milled 30/7.4)	3,994,717	Increase in Terminal Liability under Silicosis Act, 1946	5,227
Uranium and Sulphuric Acid Profit—subject to adjustment	644,991	Transfer to Uranium Reserve	400,000
Sundry Revenue less Expenditure	82,179	Dividend No. 41 of 3s. per share	1,050,000
Total Profit	4,721,887	Dividend No. 42 of 3s. per share	1,050,000
Add—		Directors' Special Remuneration	7,500
Balance to credit of Appropriation Account at December 31, 1952	311,685	Appropriation for Capital Expenditure	65,105
Amount previously appropriated for Standard Stock now written back	75,000	Balance unappropriattd at December 31, 1953	455,711
	£5,108,572		£5,108,572

* Working revenue includes £102,904 in respect of the premium arising from the sales of gold at enhanced prices.

ORE RESERVE (based on pay limit of 2.8 dwt.) (1952—2.6 dwt.):

	Tons	Stope Width (inches)	Stope Value (dwt.)	Inch-dwt.
1952	13,982,700	44.29	5.73	254
1953	13,776,600	43.83	5.48	240

The Reserve includes 5,362,100 tons, averaging 6.78 dwt. over a width of 48.31 inches on the Kimberley Reef series.

The value of the ore mined from the Reserve in 1953 was 5.95 dwt

DEVELOPMENT :—

	Footage Advanced	Footage Sampled	Percentage payable	Average reef width (inches)	Average assay value (dwt.)
Main Reef Leader	23,701	20,670	61.0	14.52	23.32
Kimberley Reef	39,351	34,185	39.6	17.12	24.58

CAPITAL EXPENDITURE.—During 1953 the expenditure under this heading on shaft sinking, development and equipment totalled £61,159; it is estimated that an amount of £25,000 will be expended for the current year. These figures are exclusive of expenditure on the uranium and acid plants, which in the year under review amounted to £814,617 and the estimated expenditure for 1954 is £150,000.

URANIUM.—The construction of the uranium and acid plants was completed. The uranium plant was opened officially by Sir Ernest Oppenheimer on May 22, 1953.

By the end of 1953 the total expenditure on the uranium and acid plants, including interest payable under the loan agreements, amounted to £4,578,724. The final cost of the plants is now estimated to be about £4,425,000, excluding interest on the loans.

As the final cost of the uranium and acid plants is somewhat in excess of the loans made to the Company, application has been made for further borrowings during 1954 to meet the total cost. In order that the Directors of the Company may enter into supplementary loan agreements, it will be necessary for their borrowing powers to be increased beyond the £4,000,000 at present authorised. Shareholders will, therefore, be asked at an Extraordinary General Meeting to be held immediately after the Annual General Meeting to consider the passing of an Ordinary Resolution to increase the borrowing powers of the Directors from £4,000,000 to £4,750,000. This latter amount is considered to be sufficient to cover the total loan facilities required to finance the cost of the uranium and acid plants and to provide a margin for any temporary borrowings by the Company.

The estimated net profit of £644,991, derived from the production of uranium and acid is subject to adjustment and covers a period of nine months during which the plants were gradually being brought into full production. Such adjustments as are necessary will be brought into the accounts for 1954.

EAST DAGGAFONTEIN MINES, LIMITED

CAPITAL : Authorised—£2,000,000. Issued—£1,865,000 in 3,730,000 Shares of 10s. each, fully paid.

Tons milled....1,104,500. Yield (per ton, 3.46 dwt.)....190,905 oz.

Income and Expenditure Account	£	Appropriation Account	£
*Revenue (per ton milled 43/5.7)	2,401,084	Union Government Income Tax	284,895
Working Costs (per ton milled 32/2.3)	1,777,961	Provincial Tax	340
Working Profit (per ton milled 11/3.4)	623,123	Increase in Terminal Liability under Silicosis Act 1946	4,158
Sundry Revenue, less Expenditure	4,327	Dividend No. 27 of 9d. per share	139,875
Total Profit	627,450	Dividend No. 28 of 10½d. per share	163,188
Add—		Directors' Special Remuneration	8,000
Balance to credit of Appropriation Account at December 31, 1952	196,355	Appropriated for Capital Expenditure	2,610
Amount previously appropriated for Standard Stock now written back	50,000	Balance unappropriated at December 31, 1953	270,739
	£873,805		£873,805

* Working revenue includes £34,198 in respect of the premium arising from sales of gold at enhanced prices.

ORE RESERVE (based on pay limit of 3.3 dwt.) (1952—3.2 dwt.) :

	Tons	Stope Width (inches)	Stope Value (dwt.)	Inch-dwt.
1952	4,360,300	36.83	4.43	163
1953	4,332,400	36.89	4.35	160

The Reserve includes 1,261,000 tons averaging 5.48 dwt. over a width of 37.12 inches on the Kimberley Reef Series. The value of the ore mined from the Reserve in 1953 was 4.46 dwt.

DEVELOPMENT :—

	Footage Advanced	Footage Sampled	Percentage payable	Average reef width (inches)	Average assay value (dwt.)
Main Reef Leader	26,225	20,625	24.2	7.34	29.75
Kimberley Reef	24,001	20,610	17.5	4.69	64.05

THE SOUTH AFRICAN LAND AND EXPLORATION COMPANY, LIMITED

CAPITAL : Authorised—£500,003. Issued—£433,125 in 2,475,000 Shares of 3s. 6d. each, fully paid.

Tons milled....1,204,500. Yield (per ton—3.65 dwt.)....219,850 oz.

Income and Expenditure Account	£	Appropriation Account	£
*Revenue (per ton milled 45/10.1)	2,760,822	Union Government Tax	275,191
Working Costs (per ton milled 34/10.2)	2,098,829	Provincial Tax	452
Working Profit (per ton milled 10/11.9)	661,993	Government Share of Profits under Mining Lease	9
Sundry Revenue, less Expenditure	10,287	Increase in Terminal Liability under Silicosis Act, 1946	6,345
Total Profit	672,280	Dividend No. 30 of 1s. 3d. per share	154,687
Add—		Dividend No. 31 of 1s. 6d. per share	185,625
Balance to credit of Appropriation Account December 31, 1952	172,807	Directors' Special Remuneration	7,515
Amount previously appropriated for Capital Expenditure written back	75,000	Appropriated for Capital Expenditure	31,255
		Balance unappropriated at December 31, 1953	259,008
	£920,087		£920,087

* Working revenue includes £38,387 in respect of the premium arising from the sales of gold at enhanced prices.

ORE RESERVE (based on pay limit of 3.4 dwt.) (1952—3.2 dwt.) :

	Tons	Stope Width (inches)	Stope Value (dwt.)	Inch-dwt.
1952	3,424,300	42.22	5.01	212
1953	3,198,200	41.60	5.22	217

The value of the ore mined from the Reserve in 1953 was 4.93 dwt.

DEVELOPMENT :—

Footage Advanced	Footage Sampled	Percentage Payable	Average reef width (inches)	Average assay value (dwt.)
59,958	39,930	32.2	25.21	19.13

CAPITAL EXPENDITURE :—

During the year under review expenditure under this heading on shaft sinking, development and equipment amounted to £28,561 ; expenditure for the current year is estimated to be £20,000.

WESTERN REEFS EXPLORATION AND DEVELOPMENT COMPANY, LIMITED

CAPITAL : Authorised—£2,000,000 ; Issued—£1,750,000 in 7,000,000 Shares of 5s. each, fully paid.

Tons milled....1,312,000. Yield (per ton, 4.07 dwt.)....257,126 oz.

Income and Expenditure Account	£	Appropriation Account	£
*Revenue (per ton milled 51/2.2)	3,359,136	Provincial Tax	7
Working Costs (per ton milled 36/3.0)	2,379,096	Share Capital Duty	625
Working Profit (per ton milled 14/11.2)	980,040	Increase in Terminal Liability under Silicosis Act, 1946	6,043
Uranium and Sulphuric Acid Profit—subject to adjustment	246,645	Dividend No. 24 of 1s. 3d. per share	437,500
Sundry Revenue, less Expenditure	14,563	Dividend No. 25 of 1s. 3d. per share	437,500
Total Profit	1,241,248	Directors' Special Remuneration	8,000
Add—		Transfer to Uranium Reserve	350,000
Funds previously appropriated for Standard Stock now written back	100,000	Balance unappropriated at December 31, 1953	382,031
Balance to credit of Appropriation Account at December 31, 1952	280,458		
	£1,621,706		£1,621,706

* Working revenue includes £47,228 in respect of the premium arising from the sales of gold at enhanced prices.

ORE RESERVE (based on pay limit of 3.2 dwt.) (1952—3.0 dwt.) :

	Tons	Stope Width (inches)	Stope Value (dwt.)	Inch-dwt.
1952	4,703,000	47.29	5.03	238
1953	4,763,000	47.46	4.88	232

The Reserve includes 86,000 tons, averaging 14.76 dwt. over a width of 40.51 inches on the Vaal Reef horizon.

The value of the ore mined from the Reserve in 1953 was 5.41 dwt.

DEVELOPMENT :—

	Footage Advanced	Footage Sampled	Percentage payable	Average reef width (inches)	Average assay value (dwt.)
Mining Lease Area	83,153	42,700	51.1	26.58	16.19

Included in the above is footage accomplished on the Vaal Reef horizon, which totalled 17,261 feet, of which 2,815 feet were sampled, 2,565 feet (91.1 per cent.) being payable, averaging 100.89 dwt. over 8.90 inches, or 898 in.-dwt.

In addition to the above, prospecting development was accomplished in a portion of Farm Goedgenoeg No. 62, which is outside the Mining Lease Area, but over which your Company holds rights under the Reserved Minerals Development Act. The footage advanced in this area totalled 7,225 feet, of which 3,751 feet were on reef and 3,755 feet sampled ; the payable footage amounted to 1,405 feet (37.4 per cent), averaging 11.91 dwt. over 40.42 inches, or 481 in.-dwt.

CAPITAL EXPENDITURE.—During 1953 the expenditure under this heading on shaft sinking, development and equipment totalled £424,958, of which £209,959 was incurred in connection with the No. 3 Vertical Shaft, and the Sub-vertical Shaft ; it is estimated that an amount of £75,000 will be expended for the current year. These figures are exclusive of expenditure on the uranium and acid plants, which in the year under review amounted to £1,645,392, and the estimated expenditure for 1954 is £250,000.

URANIUM.—The construction of the uranium and acid plants proceeded satisfactorily and the official opening of the uranium plant was performed by Dr. A. J. R. van Rhijn, Minister of Mines, on December 4, 1953.

By the end of the year under review the total expenditure on the uranium and acid plants, including interest payable under the loan agreements, amounted to £5,320,636. The final cost of the plants is now estimated at about £5,290,000, excluding interest on the loans.

The estimated final cost of the uranium and acid plants is in excess of the loans so far made to the Company and application has been made for further borrowings during 1954 to cover the additional funds required.

The estimated net profit of £246,645 derived from the production of uranium and acid is subject to adjustment and covers a period of just over three months during which the uranium plant was being brought into full production. Such adjustments as are necessary will be brought into the accounts for 1954.

LOANS—NATIONAL FINANCE CORPORATION OF SOUTH AFRICA.—During the year the Company entered into an agreement with the National Finance Corporation of South Africa, in terms of which the Finance Corporation advanced the Company the sum of £500,000 against the issue of Unsecured Redeemable Debentures. The repayment of the Debentures has been guaranteed by the Anglo American Corporation of South Africa, Limited.

ORKNEY TOWNSHIP.—The Company is the owner of Orkney Township. During the year 8 stands were sold for £725 and a balance of 1,218 stands are still available for sale. Total collections in respect of sales of stands since the inception of the Township had amounted to £90,424 at the end of 1953.

SHAREHOLDINGS.—The Company disposed of its holding of 6,392 shares in Vaal Reefs Exploration and Mining Company, Limited, during the year.

VAAL REEFS EXPLORATION AND MINING COMPANY, LIMITED

EXTRACT FROM THE STATEMENT BY THE CHAIRMAN, MR. R. B. HAGART, CIRCULATED WITH THE ANNUAL REPORT AND ACCOUNTS FOR THE YEAR ENDED DECEMBER 31, 1953.

During the year under review work continued on the opening up and proving of the Company's property, with satisfactory results.

The No. 3 vertical shaft system of Western Reefs Exploration and Development Company, Limited, in which your Company has a joint interest, is now fully equipped and working normally, and the equipment of the sub-vertical shaft is nearly complete. Twin haulages have been driven on the 4,000 foot level from the joint shaft to the site of your Company's projected No. 1 Shaft system and preparatory work is in progress for the simultaneous sinking of the No. 1 vertical and sub-vertical twin shafts.

Development was commenced from the Western Reefs No. 3 sub-vertical shaft, and, as revealed in the report of the Consulting Engineers, 8,116 feet was accomplished, 823 feet of which was on Vaal Reef. The footage sampled was 810 feet, giving 92 per cent payable averaging 99.43 dwt. over 5.54 inches, or 551 in.-dwt.

In view of these values and those obtained on the Vaal Reef horizon in the adjoining property of Western Reefs Exploration and Development Company, Limited, together with the evidence, provided by surface boreholes, of the existence of Vaal Reef over the whole of the Company's prospecting lease area, a formal application has been made to the Mining Leases Board for a mining lease over the area concerned, comprising 6,918 claims; and, subject to the raising of additional capital referred to later, the mine will be equipped for crushing as soon as possible.

The crushing plant is to be equipped to crush 65,000 tons per month, to be increased later to 75,000 tons and, having regard to the work already accomplished, it is hoped that the crushing of development rock will commence at the beginning of 1956 and the milling of stoping ore before the end of that year.

The additional capital which will be required to carry these plans to completion and to repay the present temporary loan of approximately £600,000 is estimated at approximately £8,000,000, of which about £2,400,000 will be spent on capital account during 1954. The Directors consider that about £3,500,000 of this money should be raised immediately by means of an issue of further shares.

Further particulars regarding the raising of additional capital were circulated to shareholders on March 9, 1954, and an Extraordinary General Meeting of shareholders has been convened for March 31, 1954, to consider increasing the authorised capital of the Company to provide the reserve shares necessary to proceed with the proposed issue.

The Consulting Engineers consider that the uranium values disclosed in underground development and in boreholes sunk from the surface justify your Company's applying to become a uranium producer, and application has accordingly been made to the Atomic Energy Board. If this application is granted, the funds necessary for the uranium production plant will be raised by means of loans, so that there will be no need to call on shareholders to provide any finance for this purpose. The Extraordinary General Meeting already mentioned will also be asked to increase the maximum amount which the Directors are authorised to borrow from £1,500,000 to £5,000,000, a sum which will be sufficient to cover the loans needed in connection with uranium production, and to leave a margin for any temporary borrowing that may be necessary for any other purpose.

NOTE

(1) Owing to fluctuations in the dollar sterling exchange rate, the official price of gold sold during the year varied between 246s. 8d. and 248s. per fine ounce.

THE FULL REPORTS AND ACCOUNTS CAN BE OBTAINED FROM THE LONDON SECRETARIES OF THE COMPANIES, ANGLO AMERICAN CORPORATION OF SOUTH AFRICA LIMITED, 11, OLD JEWRY, LONDON, E.C.2.

CENTRAL MINING—RAND MINES GROUP

NOTICE IS HEREBY GIVEN THAT THE ORDINARY GENERAL MEETINGS OF THE UNDERMENTIONED COMPANIES WILL BE HELD IN THE BOARD ROOM, SECOND FLOOR, THE CORNER HOUSE, COMMISSIONER STREET, JOHANNESBURG, AS FOLLOWS:

Name of Company (each incorporated in the Union of South Africa)	*Date of Meeting* 1954	*Time*	*Transfer Books and Registers of Members close as under (both days inclusive)* 1954
Crown Mines Limited ..	Monday 10th May	11 a.m.	4th to 10th May
East Rand Proprietary Mines, Limited	do.	Noon	do.
City Deep Limited	do.	2.30 p.m.	do.
Transvaal Consolidated Land and Exploration Company Limited	do.	3.30 p.m.	do.
Modderfontein B. Gold Mines Limited	Tuesday 11th May	11 a.m.	5th to 11th May
Durban Roodepoort Deep Limited	do.	Noon	do.
Rose Deep Limited	do.	2.30 p.m.	do.
Geldenhuis Deep Limited ..	do.	3.30 p.m.	do.
Rand Mines Limited	Friday 14th May	11 a.m.	8th to 14th May

ABRIDGED NOTICES OF "SPECIAL BUSINESS" TO BE CONSIDERED AT THE ORDINARY GENERAL MEETINGS OF MODDERFONTEIN B. GOLD MINES LIMITED AND ROSE DEEP LIMITED

REDUCTION OF CAPITAL

MODDERFONTEIN B. GOLD MINES LIMITED

NOTICE IS ALSO HEREBY GIVEN that at the Ordinary General Meeting of MODDERFONTEIN B. GOLD MINES LIMITED shareholders will be asked to consider a resolution as a special resolution in terms of the Companies Act (1926), as amended, of the Union of South Africa, to allow for the reduction of the authorized capital of the Company from £350,000 to £280,000 by returning to shareholders paid-up capital which is in excess of the wants of the Company to the extent of 6d. per share, thus reducing the nominal value of the shares from 2s. 6d. to 2s. each.

ROSE DEEP LIMITED

AND NOTICE IS ALSO HEREBY GIVEN that at the Ordinary General Meeting of ROSE DEEP LIMITED shareholders will be asked to consider a resolution as a Special Resolution in terms of the Companies Act (1926), as amended, of the Union of South Africa, to allow for the reduction of the authorized capital of the Company from £665,000 to £595,000 by returning to shareholders paid-up capital which is in excess of the wants of the Company to the extent of 2s. per share, thus reducing the nominal value of the shares from 19s. to 17s. each.

The Directors of the two above-mentioned Companies, in continuance of the policy of making annual repayments of capital in preference to the declaration of dividends, recommends a further capital repayment which is considered to be the more appropriate form of distribution at this late stage in the life of the mines concerned.

GENERAL NOTE

In terms of the Companies Act, as amended, of the Union of South Africa, a member entitled to attend and vote at a meeting may appoint a proxy, or where allowed, one or more proxies to attend and vote on a poll and speak in his stead. A proxy need not be a member of the Company.

Those holders of Share Warrants who wish and have the right to be represented at these meetings, can obtain the necessary information regarding the formalities to be complied with and forms of proxy on application.

BY ORDER OF THE BOARDS.
A. MOIR AND CO.,
London Secretaries.

Office of the London Secretaries:
4 London Wall Buildings, E.C.2.
April 9, 1954.

Metal and Mineral Trades

Published by The Mining Journal Ltd., 15 Wilson Street, Moorgate, London, E.C.2, and printed by Washburn & Sons Ltd. 25-27 Queens Road, Southend-on-Sea, Essex. Registered as a Newspaper.